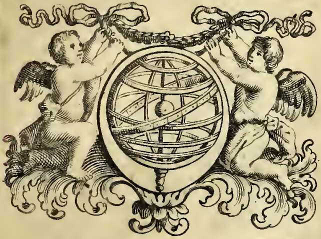
~~[illegible]~~ Delarue

Geometrie de ~~[illegible]~~

par Delarue

NOVA
GEOMETRIA,
PRACTICA
SUPER CHARTA
ET SOLO.

LIBELLUS in quo nova traditur Methodus, cujus ope facilis ſit ac brevis, ad ſumma hujuſce Scientiæ faſtigia, curſus.



AMSTELODAMI.

Apud GEORGIUM GALLET.

M. DC. XCII.

[illegible]

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[illegible]

[illegible] 1837

DOMINO

MARCHIONI

DE

SEIGNELAY.

QUòd mei erga Te, Studii & obſervantiæ, oblato Tibi hocce libello, publicum extare argumentum velim, nemo eſt, ut arbitror,

Nobiliſſime Seignelay, qui factum malè exiſtumet. Scio; ut plurimùm accidit, ut illis hujus modi munuſcula parùm conveniant quibus deſtinantur; verùm enim verò, ut in me ſimilis reprehenſio cadat, nîl eſt periculi. Et ſanè, tantam de Te, acutiſſime Seignelay, Noviſſimo iſto ac celebri examine publico, exiſtimationem dediſti, tam evidentia exquiſitiſſimi judicii argumenta, ut & ingenii ad ſublimiores Scientias nati, imprimis verò ad Mathematicam Diſciplinam; ut Tuum Te patrocinium & clientelam, meo libello, qui præcipuam hujus Scientiæ partem tradit, non denegaturum, confidere non dubitem. Et profectò, tot inter liberaliores occupationes, quibus animum Tuum exerceri, & magis ac magis perfici, aliquantiſper adhuc, par eſt: Nonne Geömetriæ ſtudio, Te aliquot horas tui temporis deſtinare oportet? Num-

Numquid ad magna illa munia, quæ Tibi certò deſtinantur, iſtâ ſcientiâ conſecrandus es? ut pote cujus ſine ope & Regulis, Domi militiæque, nîl Architectonica effectum dare poſſit; corruant urbium munitiones; & Monumenta illa publica quæ magnorum Principum nomina & gloriam Poſteritati tranſmittunt, nulla ſint. Quantam, Nobiliſſime Seignelay, in omnium animis, tuæ virtutis & ingenii ſpecimina, expectationem tui concitarint; Quàm jure ex naſcentibus luminibus, quibus mens tua ornatiſſima perpetuò micat, Gallia intelligens Te maximi viri Parentis tui veſtigia preſſurum quondam, & quemadmodum Ille, publicam felicitatem, gloriàmque invicti Monarchæ noſtri, maximo ſucceſſu, pro viribus promoturum; Quàm jure, inquam, de Te ſibi Gallia gratuletur, oblatam hîc loci, prædicandi occaſionem,

quislibet alius procul dubio arripe-ret. Me quod attinet; juſtas illas omnium acclamationes publico, ſincero, ac ſummiſſo meæ in Te obſervantiæ ac fidelitatis teſtimonio, prævertiſſe contentus, acquieſco. Vale.

DE
GEOMETRIA
IN GENERE.

GEOMETRIA vox eſt Græca, quæ ex etymo Terræ menſuram ſignificat. Sed verò, hîc loci, intelligenda eſt hac voce, Mathematices pars præcipua, Scientia nimirum illa, cujus eſt objectum quantitas continua.

Quantitas continua ea eſt, cujus omnes partes junctæ ſunt, cujusmodi ſunt omnia extenſionum, magnitudinum, & dimenſionum genera.

Complectuntur autem hæ dimenſiones lineas, angulos, ſuperficies, corpora, quæ ſingula non ſecundùm materiæ qualitatem, ſed ſecundùm partium extenſionem tantùm, conſideranda ſunt.

Diſtinguitur Geometria in Theoreticam & Practicam.

Theoretica Geometria, eſt Scientia, quæ propoſitionum Geometricarum veritatem tradit & demonſtrat.

Practica verò eſt ars, manûs in agendo, & operando directrix & ductrix.

DE EJUS ORIGINE.

ORiginem ducit Geometria ab Ægyptiis. Illis eam iveniendi occaſio fuerunt frequentes fluminis Nili exundationes, quæ, deletis agrorum finibus, magnas inter ipſos confuſiones & contentiones pariebant. Itaque iſta Diſciplina, quæ, tunc temporis, tota in agrorum menſura verſabatur, ut ſua cuique conſtaret poſſeſſio, Geometriæ nomen inde ſortita eſt. Lapſu deinceps temporis, Ægyptiorum penitiori inquiſitione, ex mechanica olim Diſciplina, nata ſenſim eſt nobiliſſima illa ſcientia, quæ inter cæteras omnes meritò primas tenet.

DE EJUS UTILITATE.

NOn utilis tantùm, ſed verò etiam neceſſaria Geometria ducenda eſt; ut pote cujus ope Aſtronomi obſervationes ſuas conficiant, cælorum immenſam extenſionem dimetiantur, temporum tractus dignoſcant, aſtrorum motus, tempeſtatum, annorum, & ſeculorum ordinem aſſequantur.

Hujus ope à Geographis effectum eſt, ut vel uno oculorum ictu, Orbis terrarum magnitudinem ſtupendam, Marium extenſionem immenſam, Imperiorum, Regnorum & Provinciarum limites, nobis quietis & ſedentibus Liceat perluſtrare.

Ab ea regulas habent Architecti, quas in publicorum juxtà & privatorum ædificiorum extructionibus ſequuntur.

Ejus ope omnia ſua opera Machinarii conficiunt, locorum & urbium ichnographias deſcribunt, diſtantias locorum, illorum etiam ad quæ ſolis oculis pertingere licet, dimetiuntur.

Illis hanc diſciplinam familiarem eſſe oportet, qui ob generis ſplendorem, militiæ nomen dare tenentur. Etenim non ſolùm ad artem fortificatoriam, quæ modum tradit munimentorum extruendorum, quibus urbes muniantur, & machinarum fabricandarum, quibus illa munimenta quatiantur, introductio eſt; Verùm etiam mul-

ta è Geometria percipitur notitia rei militaris, multùm illa confert ad inſtruendam aciem, ad caſtra metanda & dividenda. Ea præterea docet, tabulas geographicas deſcribere, Urbium, Arcium, Caſtellorum ichnographias delineare, Locorum aditu facilium & inacceſſorum quaslibet diſtantias metiri; Et, ut uno verbo abſolvam, Ea efficit, ut ſe, qui caſtra ſequuntur, non minùs conſpicuos præſtent, ingenii ſolertiâ & dexteritate, quàm fortudine & corporis robore.

Eos omnes qui delineandi artem profitentur, ſaltem Geometriam delibaſſe par eſt, ut quos, ſine ejus ope, Architectonicæ & Optices ignaros eſſe oporteat; atqui ſine illis nulla eſt Ars eorum.

GEOMETRIÆ PRINCIPIA.

PRincipiorum genera ex quibus Geometria omnis derivatur, ſunt tria: *Definitiones*, *Poſtulata*, *Axiomata*.

Definitiones ſunt breves & dilucidæ vocum explicationes.

Axiomata ſunt ſententiæ per ſe ita manifeſtæ, ut de eorum veritate nullus ſanus dubitare poſſit.

Poſtulata ſunt, quæ facilè fieri poſſe per ſe ſit manifeſtum; & quæ proinde demonſtranda non ſunt.

DEFINITIONES.

PUNCTI DEFINITIO.

PUnctum eſt cujus pars nulla eſt.

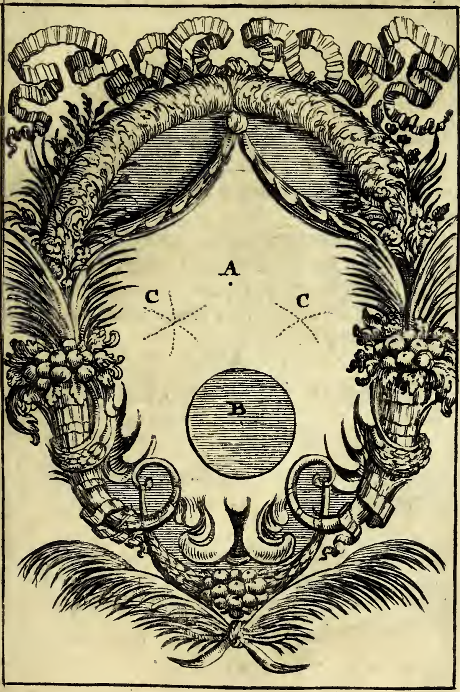
Hac definitione patet, puncti nec longitudinem eſſe, nec latitudinem, nec profunditatem; Imò ne ſub ſenſum quidem cadere, ſed ſola cogitatione percipi; cum nihil ſub ſenſum cadat, quod idem non ſit extenſum, nulla autem extenſio ſine partibus; quod Definitioni mox allatæ repugnaret. Nihilominùs, cùm nulla operatio peragi poſſit ſine interventu rerum corporearum, punctum Mathematicum neceſſe eſt puncto Phyſicô deſignari, quod viſûs eſt objectum minimum, cui nulla eſt Geometrica magnitudo, quæ ſaltem ope ſenſuum dividi poſſit: quodque acûs, circini, calami aut ſtili acumine, notatur.

Centrum punctum eſt à quo deſcribitur circulus, peripheria, rectiùs: punctum, medium eſt figuræ, ut punctum B.

Punctum ſecans illud eſt, in quo duæ ſe mutuò lineæ interſecant. Vocatur vulgò punctum ſectionis C.



NOVA GEOMETRIA
PRACTICA.


A
C
C
B

LINEÆ DEFINITIO.

Linea eſt magnitudo tantùm longa.

Linea nihil eſt aliud quam tranſitus puncti ab uno loco in alium; quæ linea aciem oculorum fugeret, ni puncti phyſici motu deſcriberetur; ut A B, C D, E F.

Tot ſunt linearum genera, quot ſunt varii modi ſecundùm quos punctum moveri poteſt. Verùm duæ tantùm ſimplices & præcipuæ lineæ conſiderantur, Recta & Curva, *quibus tertia addenda quæ ex utraque conſtat,* Mixta.

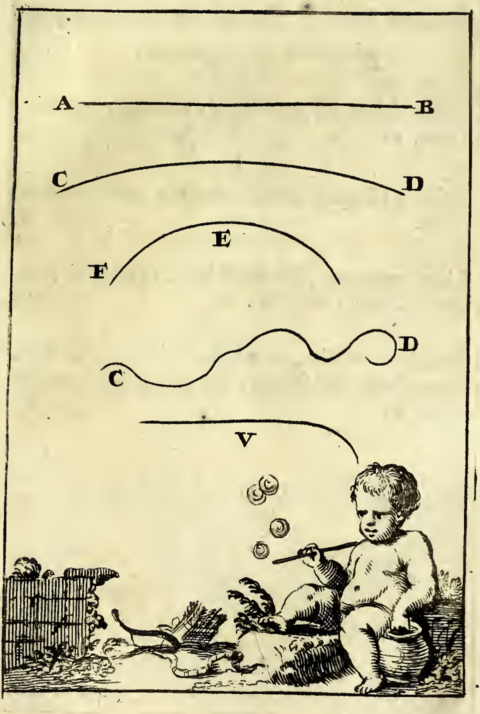
Recta linea eſt quæ ex æquo ſuis terminis interjicitur.

Vel, eſt omnium breviſſima, quæ inter duo puncta duci poſſunt, ut AB.

Curva linea eſt, quæ ab utroque extremo deflexu uno vel pluribus recedit, ut CD.

Cùm iſta linea circino ducitur, circularis vocatur, ut E.

Mixta linea eſt, quæ ſimul recta eſt & curva, ut V.


A
B
C
D
E
F
C
D
V

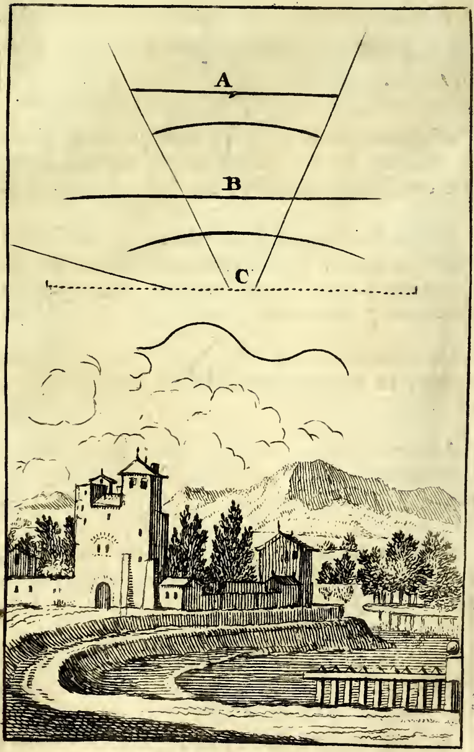
Dividitur linea in finitam & infinitam, apparentem & occultam.

Linea finita eſt quæ certis terminis continetur, ut A.

Infinita eſt quæ certis terminis non continetur, ut. B.

Linea apparens, ſeu deſcripta, ea eſt quæ atramento aut ſtylo ducitur, ut AB.

Occulta, ſeu alba, ea eſt quæ circini acumine, aut punctulis deſignatur. Vocatur linea interpuncta, ut C.


A
B
C

Varias prætereà denominationes ſortitur Linea, ſecundùm varios ejus ſitus, ac proprietates.

PErpendicularis eſt linea recta, quæ in aliam ducitur, aut ex alia excitatur, angulos utrinque conſtituens æquales, ut AB.

Perpendiculum illa linea eſto, quæ ex ſurſùm deorſùm ducta, ſine ulla in utramvis partem inclinatione, per Mundi centrum tranſiret ſi in infinitum produceretur, ut C.

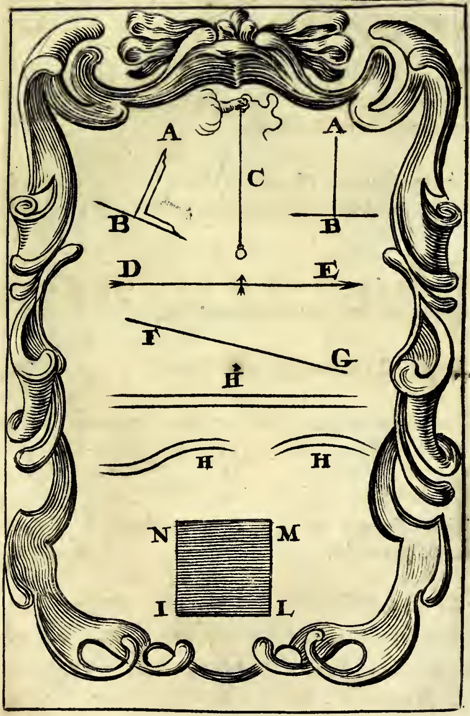
Horiſontalis linea eſt, quæ in æquilibrio poſita, in utramque partem ex æquo inclinat, ut DE.

Lineæ parallelæ eæ ſunt, quæ eodem ubique intervallo diſtant, etiamſi in infinitum producantur. H.

Obliqua linea eſt, quæ nec horiſontalis eſt, nec perpendicularis, ſed de utraque participat, ut FG.

Baſis ea eſt linea, cui Figura inſiſtere concipitur, ut IL.

Latera eæ ſunt lineæ quæ Figuram claudunt, ut INLM.


A
C
A
B
B
D
E
F
G
H
H
H
N
M
I
L

REctilineæ Figuræ diameter eſt recta, per angulos oppoſitos ducta. AB.

Diameter circuli eſt recta per centrum ducta, ad circumferentiam utrimque terminata, & circulum bifariàm dividens. D.

Linea ſpiralis eſt curva linea, quæ ducta à centro, ab eo, dùm circumducitur, ſemper re cedit. EF.

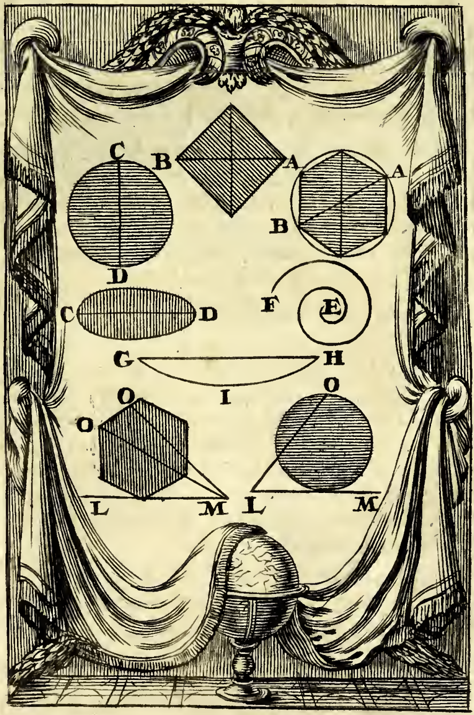
Chorda ſeu ſubtenſa eſt recta, quæ ad arcûs extrema utrimque terminatur, ut GH.

Arcus eſt circumferentiæ pars. GIH.

Ea Linea tangens dicitur, quæ Figuram quancunque tangit quidem, ſed producta non ſecat, LM.

Linea Secans ea eſt, quæ producta Figuram ſecat & pervadit. LO. MO.

Si duæ rectæ ſibi mutuò per extrema occurrant; fiet illud vel in directum, vel in indirectum. Si in directum; tunc earum altera producta, ſuper aliam tranſibit & unicam ambæ Lineam conſtituent; ſi non in directum, tunc illæ efficient angulum.


C
B
A
A
B
D
C
D
F
E
G
H
I
O
O
O
L
M
L
M

ANGULI DEFINITIO.

ANGULUS *eſt concurſus indirectus duarum linearum ad Punctum unum, ſeu potiùs, Angulus eſt ſpatium illud, quod inter duas Lineas ſibi mutuò indirectè occurrentes continetur, ut A, B, C.*

Cùm Lineæ ſibi indirectè occurrentes ſunt rectæ, vocatur ille, quem conſtituunt, Angulus rectilineus; cùm utraque linea eſt Curva, vocatur Curvilineus, cùm earum altera eſt curva, altera recta, vocatur Angulus Mixtilineus.

A. Angulus Rectilineus.

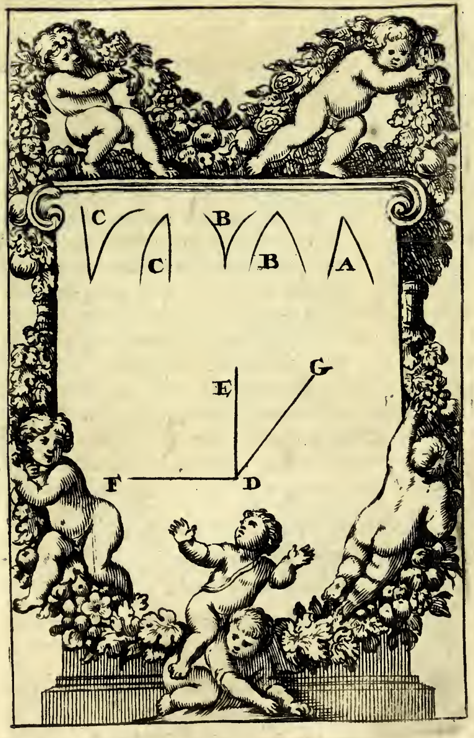
B. Angulus Curvilineus.

C. Angulus Mixtilineus.

Angulus rectilineus ex varia rectarum, quæ ipſum conſtituunt, inclinatione, diverſa nomina ſortitur, quippe, qui vocatur Rectus, acutus, obtuſus. Itaque iſta nomina *Rectilineus, Curvilineus, Mixtilineus* Linearum qualitatem exprimunt; at verò nomina *rectus, Acutus, obtuſus*, ſpatium, quod inter lineas angulum conſtituentes continetur, deſignant.

Rectus Angulus is eſt, cui à parte altera æqualis oritur, ſi unum latus produxeris.

Aliter. Rectus Angulus is eſt, cujus unum latus alteri lateri eſt perpendiculare, E D F.
Acutus angulus eſt qui recto minor eſt. EDG.
Obtuſus angulus eſt qui recto major eſt. FDG.
Litera in medio D. angulum denotat.


C
C
B
B
A
G
E
F
D

SUPERFICIEI DEFINITIO.

SUPERFICIES *duas tantùm habet dimenſiones, longitudinem & latitudinem.*

Superficies, ſecundùm Geometras, ex linea in ſe, vel in aliam ducta, producitur, quemadmodum ex puncto oritur linea. Concipe itaque Rectam E F. nulla accedente inclinatione, duci per F H. ad G H. orietur ſuperficies E F G H. quæ extenſio eſt lineis undique terminata, nullam habens profunditatem, ſed longitudinem & latitudinem tantùm. Vocatur autem illa extenſio ſuperficies, cùm ad extrema, ſeu terminos quibus circumſcribitur, non attenditur; figura, cùm ad terminos attenditur. Illi autem termini ſunt lineæ eam extenſionem ambientes.

Si ſuperficies in altitudinem excreſcit, vocatur convexa; ſi cava eſt, concava; ſi ex æquo inter terminos continetur, plana dicitur.

B Superficies Convexa.
C Superficies Concava.
A Superficies Plana.
D Superficies Convexa, concava & Plana.

Hujuſce libelli prima pars ſolius Superficiei planæ conſtructionem docet.

Terminus eſt rei alicujus extremum: Punctum eſt lineæ terminus: Linea Superficiei; Superficies eſt corporis terminus.


B
B
C
C
B
D
C
E
G
A
A
A
F
H

DE SUPERFICIEBUS SEU FIGURIS Rectilineis.

Superficies à vario laterum numero, diverſa etiam nomina ſortiuntur; ut,

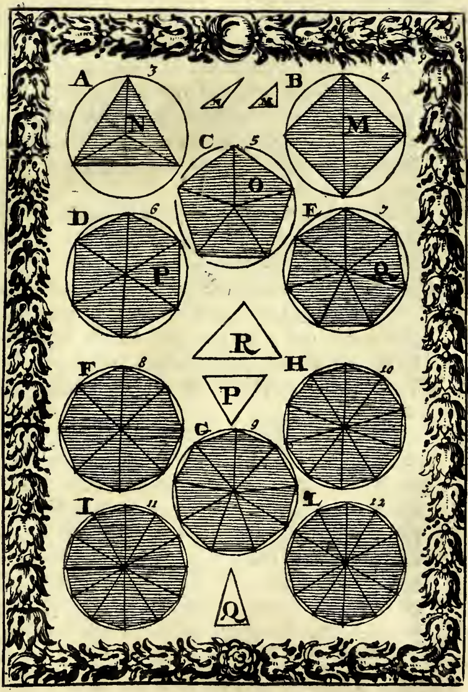
A. Trigonus ſeu triangulus, fig. trium laterum.
B. Tetragonus ſeu quadratum, fig. quatuor laterum.
C. Pentagonus, fig. quinque lat.
D. Hexagonus, fig. ſex lat.
E. Heptagonus, fig. 7. lat.
F. Octogonus, figura octo lat.
G. Enneagonus, novem lat.
H. Decagonus fig. decem lat.
I. Hendecagonus fig. undecim lat.
L. Dodecagonus fig. duodecim lat.

Hæ omnes figuræ generaliori voce vocantur etiam Polygonæ.

DE TRIANGULIS.

Denominantur etiam trianguli vel ab angulis vel à lateribus; ut

M. Triangulus Rectangulus, unum habens angulum rectum.
N. Triangulus obtuſangulus, qui unum obtuſum.
O. Acutangulus, qui omnes habet acutos angulos.
P. Triang. Æquilaterus tria habens latera æqualia.
Q. Triang. Iſoſceles duo tantùm æqualia latera.
R. Triang. Scalenus tria latera habens inæqualia.


A
3
N
B
4
M
C
5
O
D
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P
E
7
Q
R
F
8
H
10
P
G
9
I
11
L
12
Q

DE FIGURIS QUADRILATERIS.

A. QUadratum eſt figura quadrilatera, æquilatera & rectangula; ſeu quæ quatuor habet latera æqualia, æquales angulos quatuor.

B. Quadratum oblongum eſt ſuperficies rectangula, quæ quatuor quidem habet angulos rectos, ſed oppoſita tantùm latera æqualia.

C. Rhombus eſt, qui æquilaterus, ſed non æquiangulus eſt.

D. Rhomboides, quæ adverſa latera & angulos habens æqualia, neque æquilatera, neque æquiangula eſt.

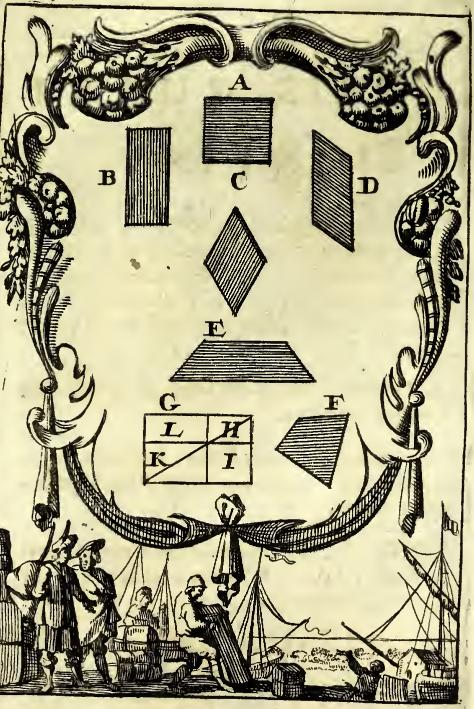
A B C D. Parallelogrammum eſt figura Quadrilatera, cujus bina oppoſita latera ſunt parallela.

E. Trapezus qui duo tantùm latera oppoſita habet parallela, duo reliqua æqualia.

F. Trapezoides & latera & angulos habet inæqualia.

G. Cùm in parallelogrammo diameter ducta fuerit, duæque lineæ lateribus parallelæ, ſecantes diametrum in uno eodemque puncto; ſecatur totum in quatuor parallelogramma: appellantur autem duo illa per quæ diameter non tranſit, Complementa; duo verò reliqua per quæ diameter incedit, circa diametrum conſiſtere dicuntur; Eorum parallelogrammorum tria, nempe unum eorum quæ circa diametrum conſiſtunt, cum duobus complementis, figuram efficiunt quæ Gnomon vocatur; itaque tria parallelogramma H. I. L. ut & tria I. K. L. Gnomonem conſtituunt.

Cæteræ omnes figuræ quæ quatuor laterum numerum excedunt, generali appellatione multilateræ vocantur.


A
B
C
D
E
G
F
L
H
K
I

DE FIGURIS CURVILINEIS.

A. Circulus eſt plana ſuperficies, unius lineæ circuitu comprehenſa, quæ circumferentia dicitur, à qua ad aliquod punctum intra contentum, quod centrum dicitur, omnes quæ duci poſſunt rectæ lineæ, ſunt æquales.

a. b. c. d. Circumferentia eſt linea circularis quæ circulum terminat.

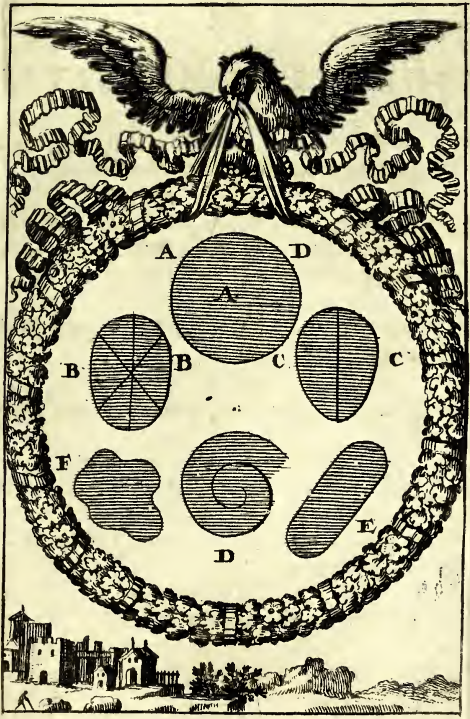
B. Ovalis figura eſt curvilinea, à pluribus centris deſcripta, quamque omnes diametri bifariàm ſecant.

C. Eſt & Eclipſis figura curvilinea à multis centris ducta, in ovi formam; eam diameter unica bifariàm ſecat.

D. Voluta eſt figura à linea ſpirali terminata.

E. Eſt figura Cylindrica.

F. Eſt figura Curva & irregularis, multis conſtans curvis lineis diſſimilibus.


A
D
A
B
B
C
C
F
D
E

DE

FIGURIS COMPOSITIS.

A. SEmicirculus eſt figura comprehenſa à Diametro & dimidia circumferentia.

B. Segmenta, ſeu Portiones circuli, ſunt partes, in quas circulum dividit recta circulum ſecans.

F. Magnum ſegmentum illud eſt, quod dimidio circulo majus.

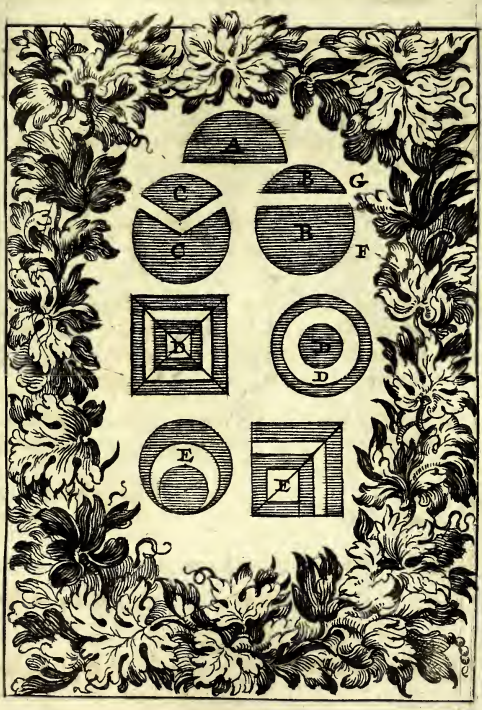
G. Parvum ſegmentum, quod ſemicirculo minus.

C. Sector eſt pars circuli à duobus ſemidiametris & arcu (ſemicircumferentiâ majore vel minore) quem ſemidiametri intercipiunt, comprehenſa.

Eſt & magnus & parvus Sector.

D. Figuræ Concentricæ eæ ſunt quarum idem centrum eſt.

E. Figuræ excentricæ figuræ ſunt internæ à pluribus centris ductæ.


A
C
B
G
C
B
F
D
D
D
E
E

DE
FIGURIS REGULARIBUS
& Irregularibus.

A. FIgura regularis ea eſt quæ oppoſita latera & angulos, ſimilia habet & æqualia.

B. Figura irregularis eſt, quæ angulos & latera oppoſita habet inæqualia.

EE. Figuræ ſimiles eæ ſunt, quarum ſingula latera unius, ad ſingula alterius ſunt proportionalia; quamvis una earum ſit alterâ major vel minor, vel illi æqualis.

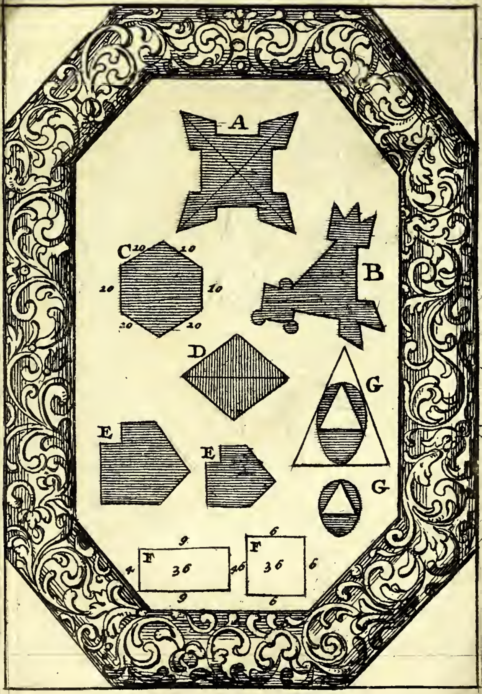
FF. Figuræ æquales eæ ſunt, quæ æquale ſpatium continent; eæ autem vel ſimiles vel diſſimiles eſſe poſſunt.

C. Figura æquiangula omnes angulos habet æquales.

EE. Figura una alteri æquiangula eſſe dicitur, cùm unius ſinguli anguli, alterius ſingulis ſunt æquales.

CD. Figura æquilatera omnia habet æqualia latera.

GG. Figuræ curvilineæ ſimiles dicuntur eæ, in quibus inſcribi & circa quas circumſcribi poſſunt ſimiles polygonæ.


A
B
C
20
20
20
10
20
20
D
E
E
G
G
F
36
9
9
4
46
F
36
6
6
6



AXIOMATA.

AXIOMATA.

I.

Per definit. circuli.

QUæ eidem ſunt æqualia, & inter ſe æqualia ſunt.

Lineæ A C, A C, quia æquales A B, æquales ſunt inter ſe.

II.

Si æqualibus addas æqualia, tota erunt æqualia.

Lineæ A C, A C ſunt æquales;
additæ C D, C D pariter ſunt æquales;
totæ A D, A D erunt æquales.

III.

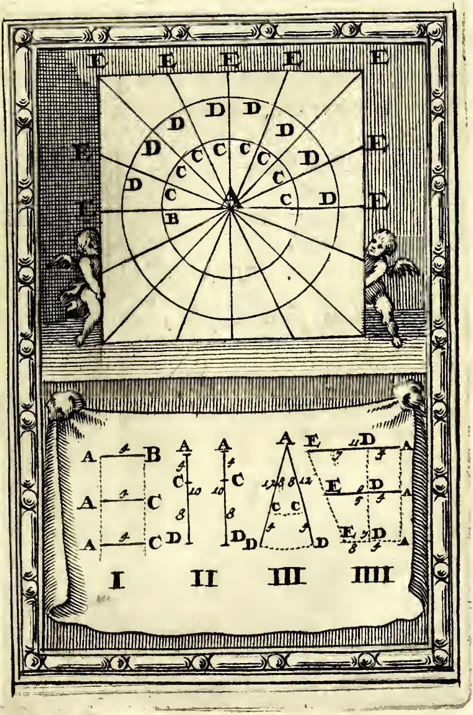
Si æqualibus demas æqualia, quæ remanebunt erunt æqualia.

Si lineis æqualibus	A A, D D.
demas partes æquales	A C, A C.
partes remanentes	C D, C D.
erunt æquales.	

IV.

Si inæqualibus addas æqualia, tota erunt inæqualia.

Si inæqualibus lineis	D E, D E.
addas æquales	A D, A D.
totæ	A E, A E.
inæquales erunt.	


I
II
III
IIII

V.

Si inæqualibus demas æqualia, quæ remanebunt, erunt inæqualia.

Si inæqualibus lineis	AE, AE.
demas æquales	AD, AD.
quæ remanebunt lineæ	DE, DE.
inæquales erunt.	

VI.

Quæ ejuſdem ſunt dupla, inter ſe ſunt æqualia.

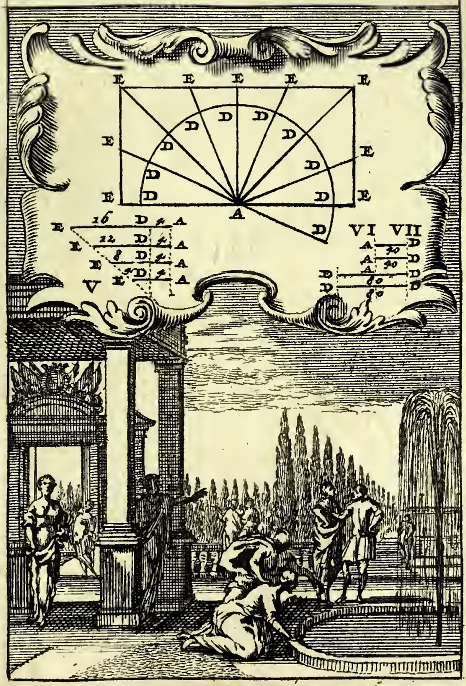
Quoniam rectæ	DD, DD.
duplæ ſunt rectæ	AD.
inter ſe ſunt æquales.	

VII.

Quæ ejuſdem aut æqualium ſunt dimidia, inter ſe ſunt æqualia.

Lineæ	AD, AD.
quæ dimidia ſunt linearum	DD, DD.
ſunt inter ſe æquales.	

Porrò iſta axiomata non minùs de numeris, de ſuperficiebus & ſolidis, quàm de lineis vera ſunt.


E
D
A
V
VI
VII
16
12
8

POSTULATA.

POSTULATA QUÆ
Ad praxim requiruntur.

POSTULATUM I.

A Quolibet puncto A, ad quodlibet punctum B, ducatur recta AB.

PRAXIS.

Applica regulam ad puncta A & B
Duc quæſitam AB
quod ut fiat, duc juxta regulam calamum aut ſtilum à puncto A
uſque ad punctum. B

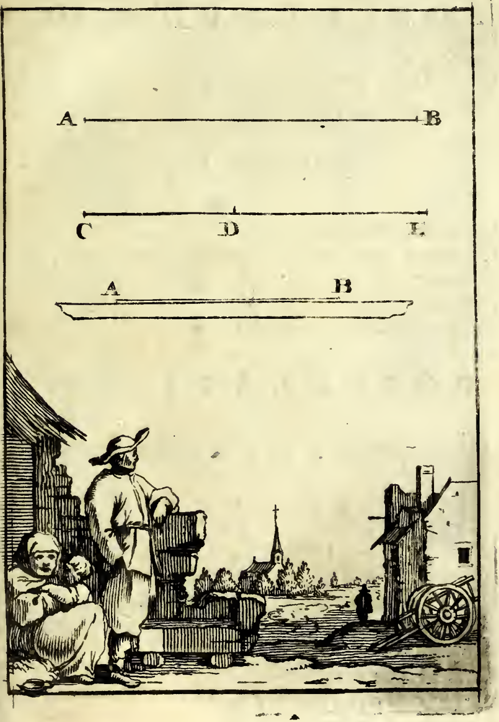
POSTULATUM II.

Producatur in infinitum recta CD, per D.

PRAXIS.

Applica Regulam ad lineam CD.
Protrahe in infinitum dictam CD
quod fiet, calamum ducendo juxta regulam, à D versùs E

POSTULAT


A
B
C
D
E
A
B

POSTULATUM III.

Centro A, & intervallo *AB.*
deſcribe circulum *ABCD.*

PRAXIS.

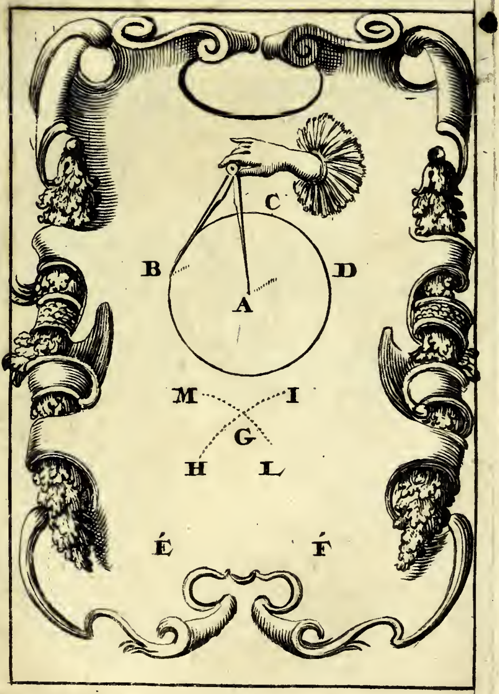
Circino cape intervallum AB.
Circinum ita move, ut immoto mucrone A.
mucro B.
circumagatur.
Emerget quæſitus circulus BCD.

POSTULATUM IV.

A datis punctis E & F, Sectionem facere.

PRAXIS.

Aperiatur circinus utcunque; ita tamen ut mucronum diſtantia ſit major dimidiâ diſtantiâ, quæ inter duo puncta data E & F. intercedit.
Eo circini intervallo
à puncto E deſcribe arcum LM.
A puncto F deſcribe arcum HI.
Fiet ſectio G.
quæ quærebatur.


C
B
D
A
M
I
G
H
L
É
F́

LIBER PRIMUS
DE
LINEARUM
DESCRIPTIONE.

LIBER PRIMUS.

PROPOSITIO I.

E puncto dato in recta perpendicularem excitare.

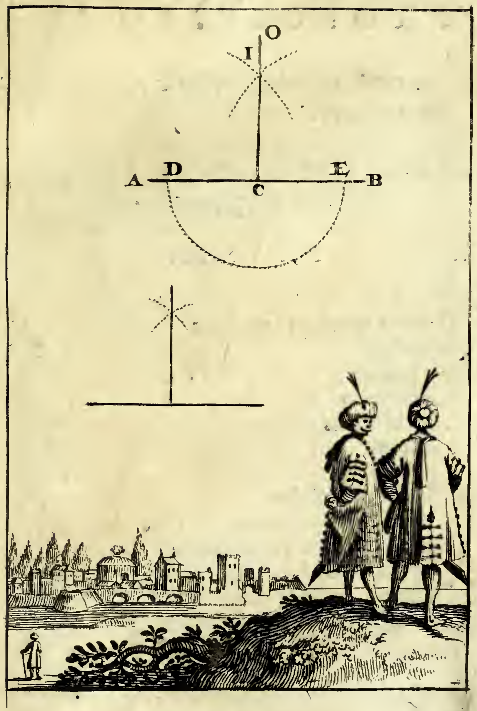
HYPOTHESIS.

Sit C. datum punctum in media recta AB. è quo excitanda perpendicularis.

PRAXIS.

Per4. poſtul.	A Dato puncto	C.
	deſcribe utcumque ſemicirculum	DE.
	A punctis	D & E.
	fac ſectionem	I.
	A puncto	C.
	duc petitam rectam	CO.
	per ſectionem	I.

Erit recta C O, ad datam rectam perpendicularis & è puncto dato C, excitata.


O
I
A
D
E
B
C

PROPOSITIO II.

Ex extremitate datæ rectæ, perpendicularem excitare.

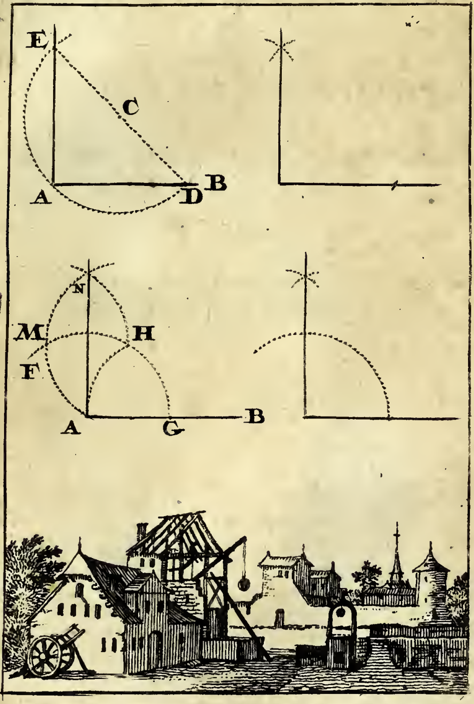
Sit A datum punctum rectæ AB. è quo puncto excitanda ſit perpendicularis.

PRAXIS.

SUmatur utcunque puctum	C.
ſupra rectam	AB.
A quo puncto	C.
intervallo	CA.
deſcribatur arcus	EAD
Duc rectam	DCE.
per puncta	D & C.
Duc lineam quæſitam	AE.
Illa erit perpendicularis rectæ	AB.
& quidem ex extremitate	A.
excitata.	

Aliter.

A puncto A deſcribe arcum	GHM.
A puncto G deſcribe arcum	AH.
A puncto H deſcribe arcum	AMN.
A puncto M deſcribe arcum	HN.
Duc quæſitam	AN.


E
C
B
A
D
N
M
H
F
A
G
B

PROPOSITIO III.

Super dato Angulo, rectam conſtituere, quæ in neutram partem inclinet.

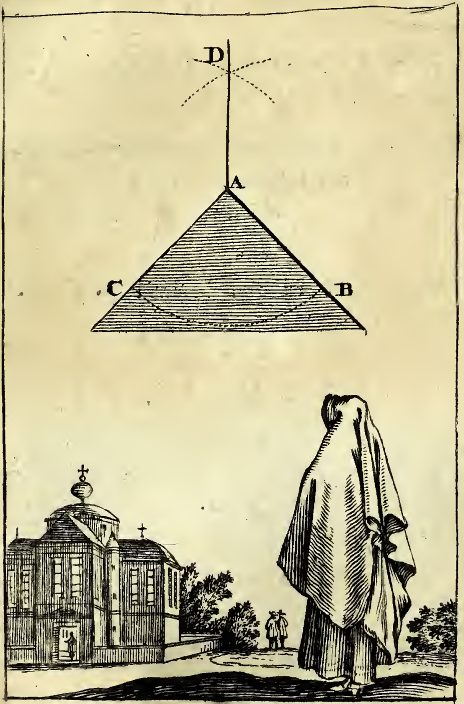
Sit B A C datus angulus, ſuper quo conſtituenda recta, quæ in neutram partem inclinet.

PRAXIS.

AB angulo dato	A.
deſcribe utcunque arcum	BC.
A punctis ſeu extremis	B & C.
fac ſectionem	D.
A puncto, ſeu dato angulo	A.
duc rectam quæſitam	AD.
per ſectionem	D.

Recta	A D.
ſuper angulo	B A C.

conſtitata, in neutram partem inclinabit.


D
A
C
B

PROPOSITIO IV.

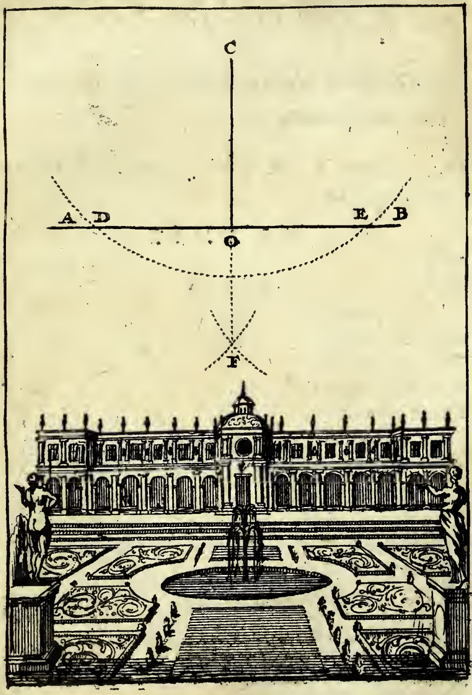
Ex dato, extra rectam datam, puncto, perpendicularem ducere.

Sit punctum C. ex quo ducenda perpendicularis in A B.

PRAXIS.

A Puncto dato	C.
deſcribatur utcunque arcus	D E.
ſecans rectam	A B.
in punctis	D & E.
Ab illis punctis	D & E.
fac ſectionem	F.
Duc rectam	C F.

Dico rectam	C O,
eſſe quæſitam.	


C
A
D
E
B
O
F

PROPOSITIO V.

Per punctum datum ducere parallelam ad rectam datam.

Sit punctum A per quod ducenda parellela ad rectam B C.

PRAXIS.

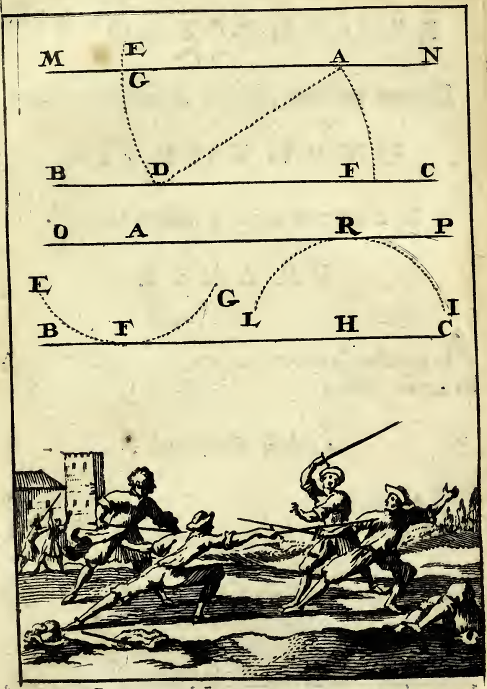
DUc utcunque obliquam	A D.
A puncto	A.
deſcribe arcum	D E.
A puncto	D.
deſcribe arcum	A F.
Sume arcum	D G.
æqualem arcui	A F.
Dico quæſitam lineam eſſe	M N.
per puncta ductam	A & G.

Aliter.

A puncto A. deſcribe arcum	E F G.
qui rectam tangat.	B C.

Eodem circini intervallo,

A puncto H, deſcribatur arcus	L R I.
(punctum A. ſitum ſit utcunque in recta B C.)	
Duc quæſitam	O P.
per punctum	A.
tangentem arcum	L R I.


M
E
A
N
G
B
D
F
C
O
A
R
P
E
G
I
B
F
L
H
C

PROPOSITIO VI.

Datam rectam finitam bifariàm ſecare.

HYPOTHESIS.

Sit A B recta finita bifariàm ſecanda.

PRAXIS.

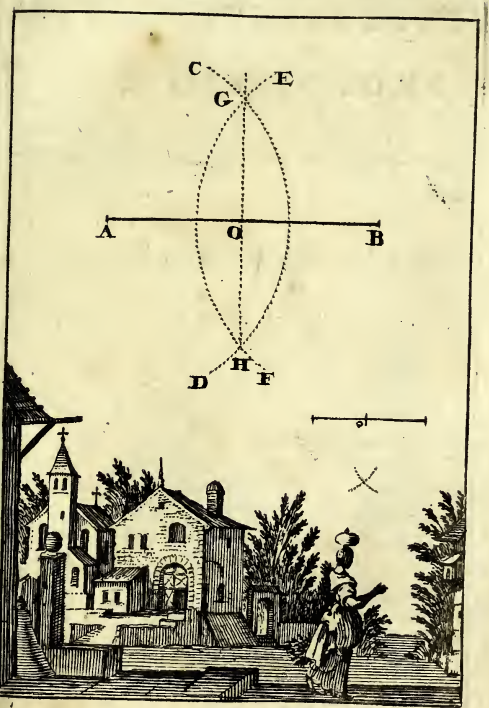
A puncto ſeu extremitate A.
Deſcribe arcum C D.

Eodem intervallo,

A puncto B.
Duc arcum E F.

Requiritur ut duo illi arcus ſe interſecent;

Duc rectam G H.
per ſectiones G & H.
Dico A B in puncto O.
bifariàm diviſam.


C
E
G
A
O
B
H
D
F

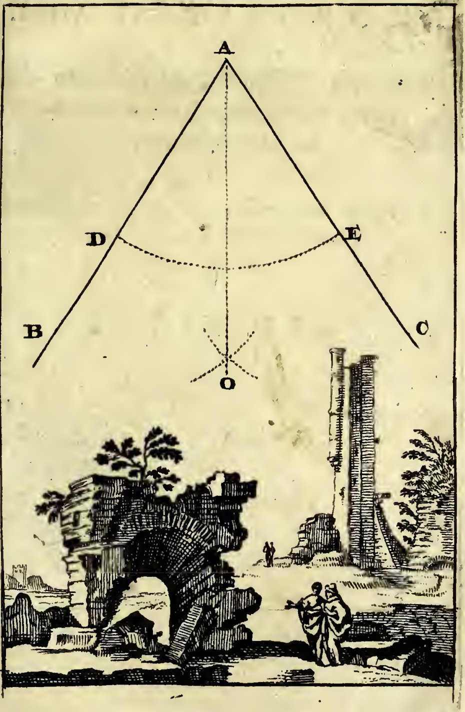
PROPOSITIO I.

Datum angulum rectilineum bifariàm ſecare.

Sit BAC. angulus bifariàm ſecandus

PRAXIS.

AB angulo	A.
deſcribe utcunque arcum	DE.
E punctis	D & E.
fac ſectionem	O.
Duc rectam	AO.
Dico angulum datum	BAC.
à recta	AO.
bifariàm ſecatum.	


A
D
E
B
C
O

PROPOSITIO VIII.

Dato angulo rectilineo, ad punctum datæ rectæ, æqualem angulum rectilineum conſtituere.

Sit A. rectæ extremitas, ad quam angulus ſit conſtituendus dato CDG. æqualis.

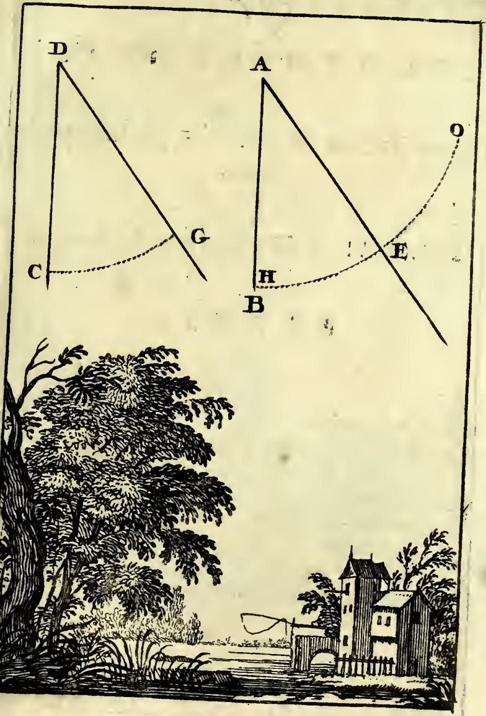
PRAXIS.

Ex angulo	D.
deſcribe utcunque arcum	CG.

Eodem intervallo.

A puncto, ſeu extremitate	A.
deſcribe arcum	HO.
Duc arcum	HE.
æqualem arcui	CG.
Duc rectam	AE.

Dico angulum	BAE.
æqualem	CDG.
Q. E. F.	


D
A
O
G
E
C
H
B

PROPOSITIO IX.

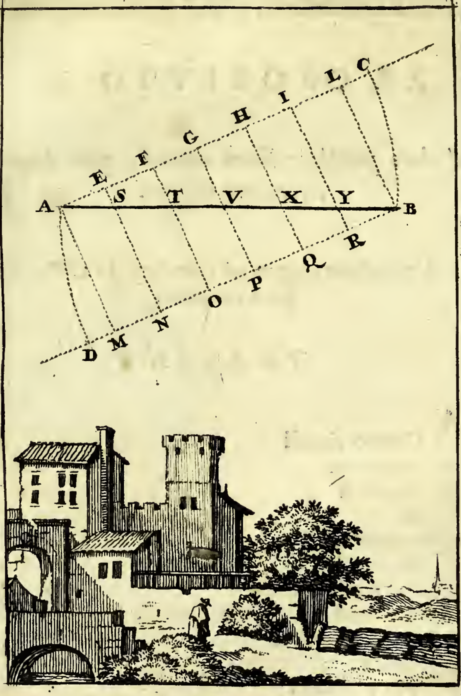
Datam rectam in quotlibet partes æquales ſecare.

Sit recta AB in ſex partes æquales ſecanda.

PRAXIS.

AB extremitate A.
duc rectam utcunque A C.
Ab extremitate B.
pag. 54. duc rectam B D.
parallelam rectæ A C.
A punctis A & B.
& ſuper rectis A C, B D.
ſume utcunque ſex partes æquales; quales ſunt
E F G H I L ſuper recta A C.
R Q P O N M ſuper recta B D.
Ducantur rectæ E N, F O, G P, H Q, I R.

Dico rectam A B. diviſam in ſex partes æquales, in punctis ſectionum S. T. V. X. Y,


A
B
C
D
E
F
G
H
I
L
M
N
O
P
Q
R
S
T
V
X
Y

PROPOSITIO X.

A dato puncto rectam ducere, quæ datum circulum tangat.

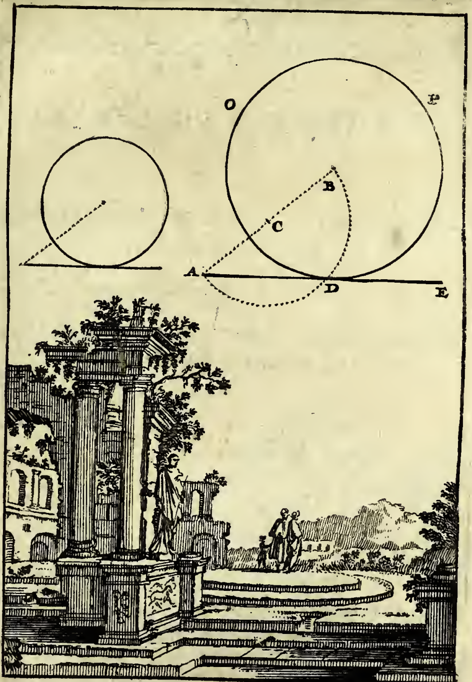
Sit A punctum, à quo ad circulum D O P, tangens ducenda.

PRAXIS.

Pag. 58.

A Centro circuli	B.
Duc ſecantem	B A.
Bifariàm ſeca	B A.
in	C.
A quo puncto	C.
intervallo	C A.
deſcribe ſemicirculum	A B D.
qui datum circulum ſecet in	D.
A dato puncto	A.
duc rectam	A E.
per punctum	D.

Dico rectam	A E.
tangentem eſſe quæſitam.	


O
P
B
C
A
D
E

PROPOSITIO XI.

Ad datum, in circumferentia, punctum tangentem ducere.

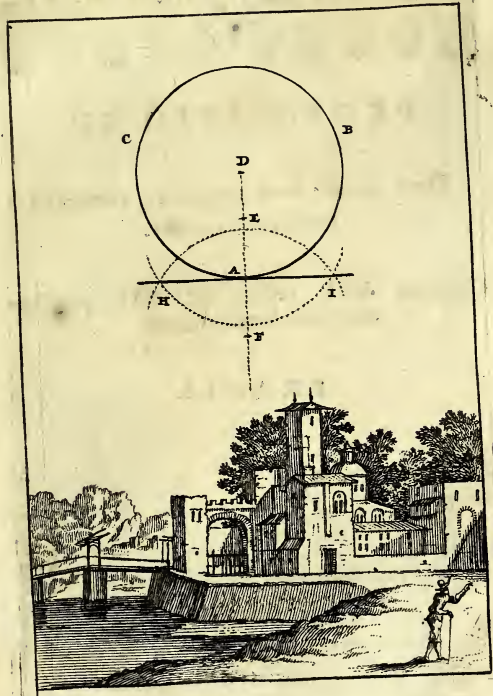
Sit datus circulus A B C, in cujus circumferentia ſit datum punctum A.

PRAXIS.

A Centro	D.
ducatur recta	DE.
per datum punctum	A.
Ad datum punctum	A.
ſuper rectam	DF.
duc perpendicularem	AH.
productam in	I.

Pag. 46.

Dico rectam	HI.
eſſe tangentem quæſitam	


C
B
D
E
A
H
I
F

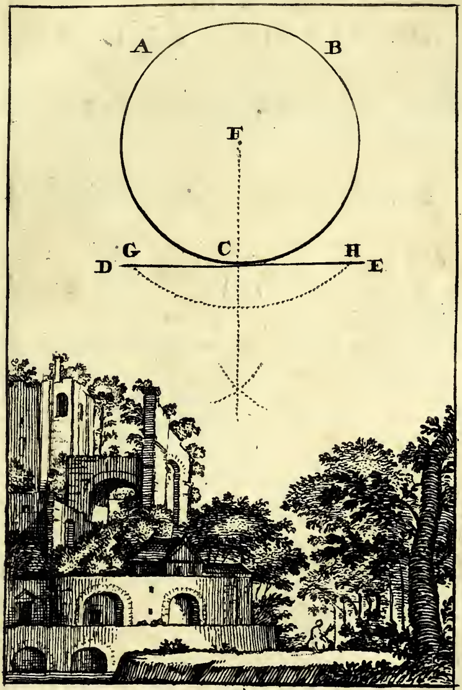
PROPOSITIO XII.

Dato circulo cum tangente, contactûs punctum invenire.

Circulum ABC tangat recta GH, punctum contactûs inveniendum.

PRAXIS.

A Centro circuli F.
duc perpendicularem FC.
ſuper tangentem DE.
Dico rectam FC.
per punctum contactûs tranſire.


A
B
F
G
C
H
D
E

PROPOSITIO XIII.

Super data recta lineam ſpiralem deſcribere.

Sit I L recta, ſuper qua ſpiralis linea deſcribenda.

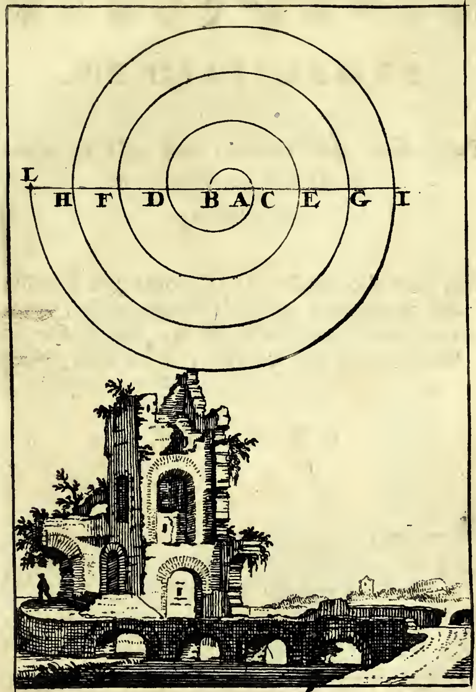
PRAXIS.

MEdiam rectam I L;
pag. 62. in tot æquales partes divide, quot in linea ſpirali circuitus eſſe vis.

EXEMPLI GRATIA.

ſi quatuor circuituum eam eſſe vis,

Divide B I.
dimidium rectæ L I.
in quatuor partes æquales B C E G I.
Præterea B C.
pag. 65. biſariàm ſeca in A.
A quo puncto A,
deſcribe ſemicirculos B C, D E, F G, H I.
A puncto B.
deſcribe ſemicirculos C D, E F, G H, I L.
Habebis ſpiralem quæſitam.


L
H F D B A C E G I

PROPOSITIO XIV.

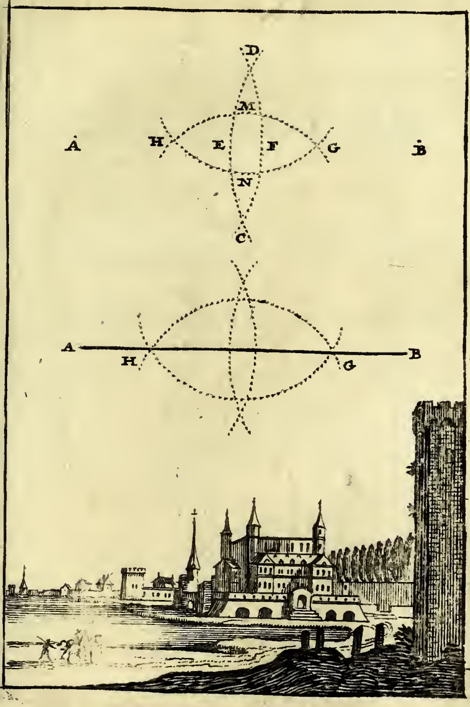
Inter data duo puncta, duo alia ex æquo & directè interjacentia deſignare.

Sint data duo puncta A & B. inter quæ duo alia ſint deſignanda directè interjacentia, quorum ope à puncto A ad B, Regulâ quæ ſit totâ diſtantiâ AB brevior, recta duci poſſit.

PRAXIS.

A Punctis	A & B.
fac ſectiones	C & D.
Rurſùs, à punctis	C & D.
fiant ſectiones	G & H.
Dico	G & H.

puncta eſſe quæſita, quorum ope expeditè ducatur recta, à puncto A. ad B, Regulâ, toto intervallo AB. breviori.


D
M
A
H
E
F
G
B
N
C
A
B
H
G

LIBER SECUNDUS
IN QUO
PLANARUM FIGURARUM
CONSTRUCTIO TRADITUR.

LIBRI SECUNDI

PROPOSITIO I.

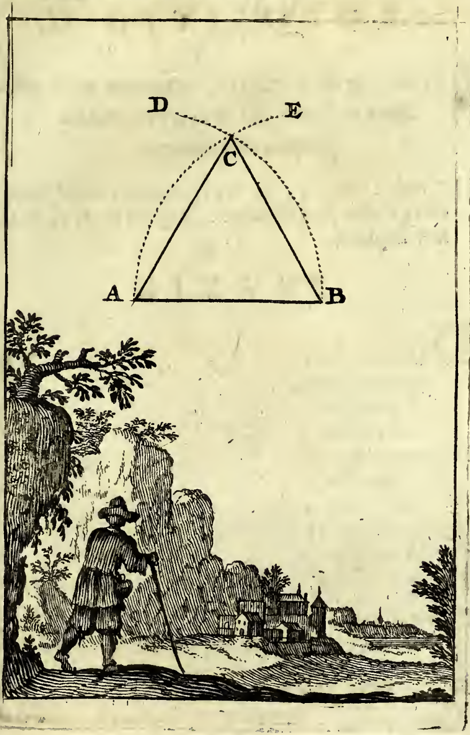
Super data recta finita triangulum æquilaterum conſtituere.

Sit AB recta ſuper qua conſtituendus triangulus æquilaterus,

PRAXIS.

AB extremitate	A.
intervallo	AB.
deſcribatur arcus	BD.
Ab extremitate	B.
intervallo	BA.
deſcribatur arcus	AE.
A puncto ſectionis	C.
ducantur rectæ	CA, CB.

Dico ABC triangulum eſſe æquilaterum, illum ipſum, qui quærebatur


D
E
C
A
B

PROPOSITIO II.

Ex datis tribus rectis, quarum duæ quælibet reliquâ ſint majores, triangulum conſtituere.

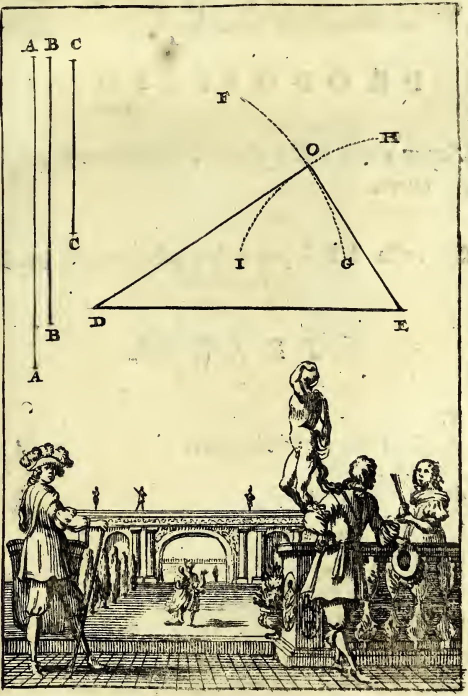
Sint rectæ datæ A, B, C, triangulus conſtituendus, cujus ſingula latera, ſingulis datis A, B, C. ſint æqualia.

PRAXIS.

DUcatur recta	DE.
æqualis rectæ	AA.
A puncto	D.
intervallo	BB.
deſcribatur arcus	GF.
A puncto	E.
intervallo	CC.
deſcribatur arcus	HI.
A ſectione	O.
Ducantur rectæ	OE, OD.

Dico triangulum DEO, tribus rectis conſtare, æqualibus datis.

Notandum porrò, quod in aſſertione ſubmonuimus, trianguli conſtructionem eſſe impoſſibilem, ni duæ quælibet ex datis rectis reliquâ ſint majores.


A B C
F
O
H
C
I
G
D
E
B
A

PROPOSITIO III.

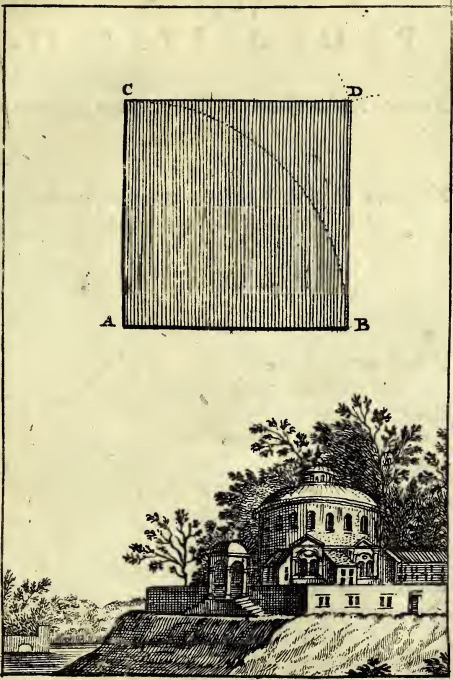
Super data recta finita, quadratum conſtituere.

Sit recta A B ſuper quâ quadratum ſit conſtituendum.

PRAXIS.

P. 48. EXcitetur perpendicularis	A C.
A puncto	A.
deſcribatur arcus	B C.
A punctis	B & C.
intervallo	A B.
fiat ſectio	D.
A quo puncto	D.
ducantur rectæ	DC, DB.

Dico ABCD eſſe quadratum quæſitum.


C
D
A
B

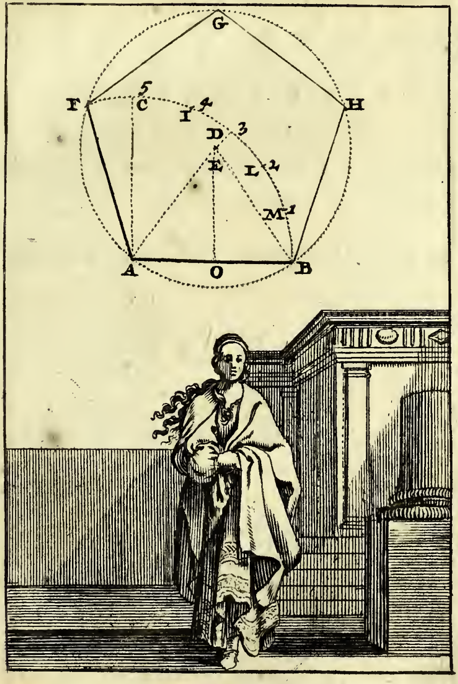
PROPOSITIO IV.

Super recta data Pentagonum ordinatum conſtruere.

Sit recta data A B, ſuper qua conſtruendus ſit pentagonus ordinatus.

PRAXIS.

P. 48.	AB extremitate	A.
P. 56.	intervallo	A B.
P. 46.	deſcribe arcum	B D F.
	Excita perpendicularem	A C.
	Dividatur arcus	B C.
	in quinque partes æquales	I D L M.
	Duc rectam	A D.
	Baſim	A B.
	bifariàm ſeca in	O.
	Excitetur perpendicularis	O E.
	A puncto ſectionis	E.
	intervallo	E A.
	deſcribatur circulus	A B F G H.
	Transfer quinquies rectam	A B.
	in circumferentiam circuli, fiet pentagogonus ordinatus, æquilaterus	A B F G H.


G
F
5
C
4
I
H
D
3
E
L
2
M
1
A
O
B

PROPOSITIO V.

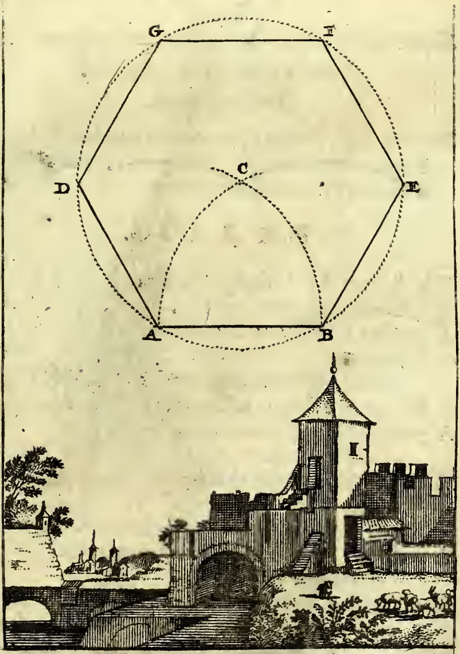
Super data recta Hexagonum ordinatum conſtituere.

Sit recta A B ſuper qua Hexagonus ſit conſtituendus.

PRAXIS.

AB extremitatibus	A & B.
intervallo	A B.
deſcribantur arcus	A C, B C.
A ſectione	C.
deſcribatur circulus	A B E F G.
Datam	A B.

ſexies in circumferentiam transfer ; habebis Hexagonum ordinatum A B E F G D. ſuper datâ recta A B conſtitutum.


G
F
C
D
E
A
B

PROPOSITIO VI.

Super data recta quemlibet polygonum conſtituere, ab Hexagono ad Dodecagonum.

Sit data AB, ſuper qua conſtituendus ſit hexagonus, heptagonus, octogonus, aut quilibet alius uſque ad dodecagonum.

PRAXIS.

pag. RECtam AB bifariàm ſeca in O.
56. Excita perpendicularem OI.
pag. A puncto B deſcribe arcum AC.
46. Arcum AC.
divide in partes æquales ſex MNPQR.

Hoc peracto, heptagonum hac ratione cbtinebis.

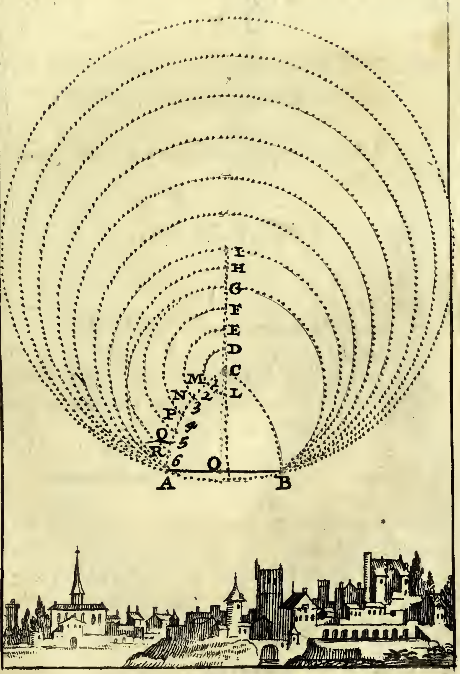
A puncto C. intervallo unius partis CM.
deſcribatur arcus MD.
A centro D. ille qui deſcribetur circulus, ſepties capiet rectam AB.

Octogonus verò ita conſtruetur.

A puncto C, intervallo duarum partium CN.
deſcribatur arcus NE.
Erit E centrum à quo deſcriptus circulus intervallo EB. octies rectam capiet AB.

Si quæratur Enneagonus.

Sumatur intervallum trium partium CP.
& ita deinceps CQ, CR.
ita ut præcedentibus ſemper nova particula arcûs A adjiciatur.


I
H
G
F
E
D
C
L
M
N
P
Q
R
1
2
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5
6
O
A
B

PROPOSITIO VII.

Super data recta quemlibet Polygonum conſtituere à 12. uſque ad 24. latera.

Sit data A B ſuper qua conſtituendus ſit quilibet Polygonus.

PRAXIS.

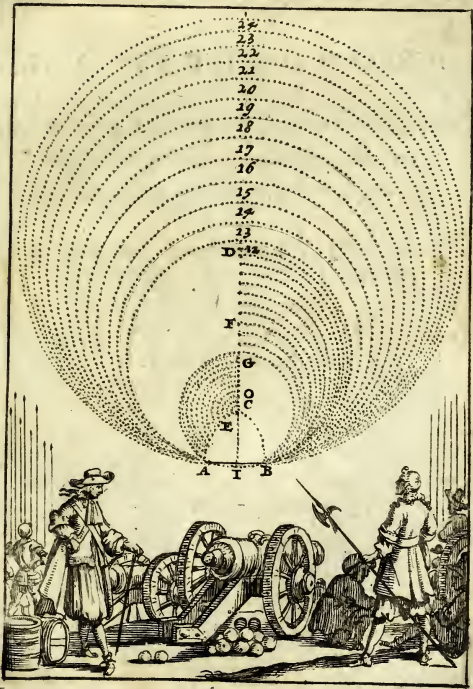
ARcum A C.
in partes æquales duodecim divide.
A puncto C.
tot partes in C A ſumantur ſupra duodecim, quot opus eſt, ut tot partes habeantur quot latera quæruntur.

EXEMPLI CAUSSA.

Si quæratur figura quindecim laterum.

A puncto C.
intervallo trium partium C E.
Deſcribatur arcus E O.
Partes A C ſunt duodecim ; C O verò ſunt tres, quæ omnes ſimul ſumptæ æquantur 15.
A puncto O intervallo O B.
Deſcribatur arcus B F.
A puncto F intervallo F A.
deſcribatur circumferentia ; illa quindecies rectam capiet A B.

Res ita in cæteris polygonis procedet


24
23
22
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18
17
16
15
14
13
D 12
F
G
O
C
E
A
I
B

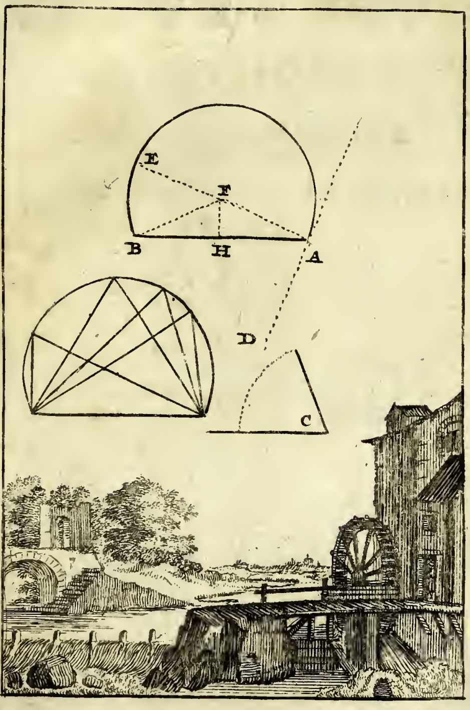
PROPOSITIO VIII.

Super data recta ſegmentum ſeu portionem circuli deſcribere, cui inſeri poſſit angulus dato angulo æqualis.

Sit recta finita A B ſuper qua deſcribendus ſit arcus cui inſeri poſſit angulus dato angulo C. æqualis.

PRAXIS.

P. 60.	FAc angulum	BAD.
P. 48.	æqualem angulo	C.
	E puncto A in	AD.
P. 56.	excita perpendicularem	AE.
	Rectam	AB.
P. 44.	bifariàm ſeca in	H.
	Super B A è puncto ſectionis H, excita perpendicularem	HF.
	E puncto ſectionis	F.
	intervallo	FA.
	deſcribatur portio circuli	AEB.
	Erunt quilibet anguli ſuper data	AB,
	& portione circuli contenti, æquales dato angulo	C.


E
F
B
H
A
D
C

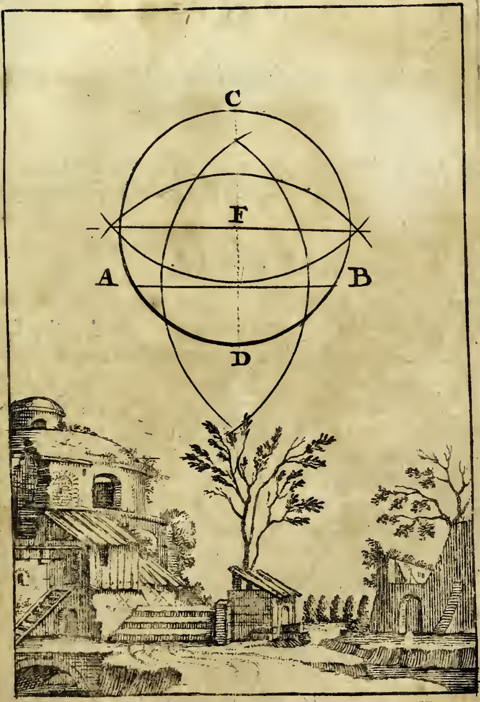
PROPOSITIO IX.

Dati circuli centrum invenire.

Sit circulus A B C, cujus inveniendum ſit centrum.

PRAXIS.

	DUcatur utcumque recta	A B.
p. 56.	quæ intra circumferentiam terminetur.	ABC.
Ibid.	Rectam	AB.
	bifariàm ſecet recta	DC.
	Rectam	CD.
	bifariàm pariter ſeca in	F.
	Dico punctum	F.
	eſſe centrum dati circuli	ABC.


C
F
A
B
D

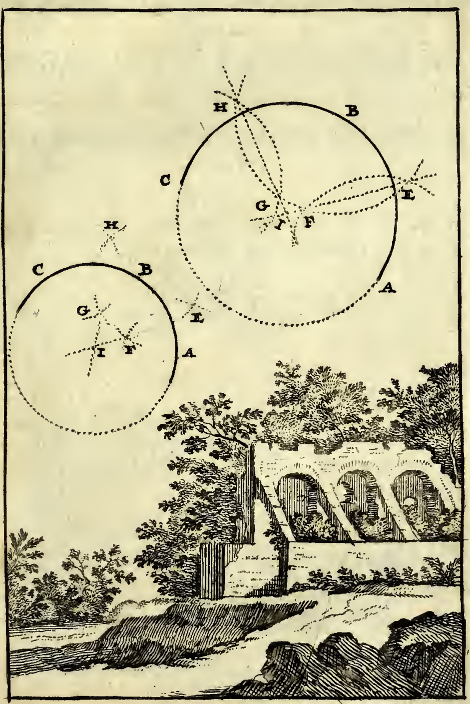
PROPOSITIO X.

Incoeptam circumferentiam cujus ignoratur centrum abſolvere.

Sit A B C circumſerentiæ cujuſcunque data particula ; hujus inveniendum centrum, abſolvi ut poſſit.

PRAXIS.

TRia puncta	A, B, C,
in circumferentia incœpta ubicunque deſignentur.	
A punctis	A & B.
fiant ſectiones	E & F.
Ducatur recta	E F.
A punctis	B & C.
fiant ſectiones	G & H.
Ducatur recta	G H.
A puncto interſectionis & centro	I.
intervallo	I A.
abſolvatur circumferentia.	


H
B
C
E
G
I
F
A
H
C
B
G
E
I
F
A

PROPOSITIO XI.

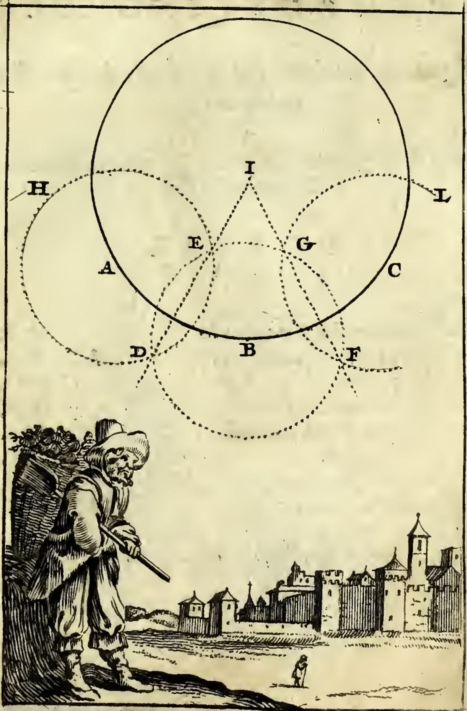
Per data tria puncta circumferentiam ducere.

Sint A, B, C. tria data puncta, per quæ circumferentia ſit ducenda.

PRAXIS.

A Datis punctis A, B, C.
deſcribantur tres circuli DEH, DEF, FGL, eodem intervallo, & ita quidem ut ſe mutuò ſecent in punctis D & E, F & G.
Ducantur rectæ DE, FG.
donec concurrant in I.
Ab eo puncto I.
intervallo IA.
ducatur quæſita circumferentia.

Similis eſt precedenti praxis iſta.


I
H
L
E
G
A
C
D
B
F

PROPOSITIO XII.

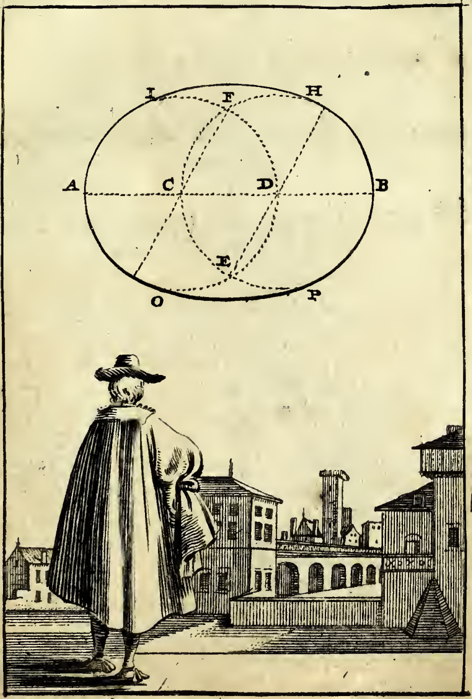
Figuram ovalem ſuper data longitudine conſtituere.

Sit AB longitudo definita, ad quam conſtituenda ſit ovalis figura.

PRAXIS.

Dividatur data longitudo	A B.
in partes æquales tres	AC DB.
A punctis	C & D.
intervallo	C A,
deſcribantur circuli	AEF, BEF.
A ſectionibus	E & F.
intervallo Diametri	E H,
Deſcribantur arcus	I H, O P.

Dico AIHBPO eſſe quæſitam ovalem.


I
F
H
A
C
D
B
E
O
P

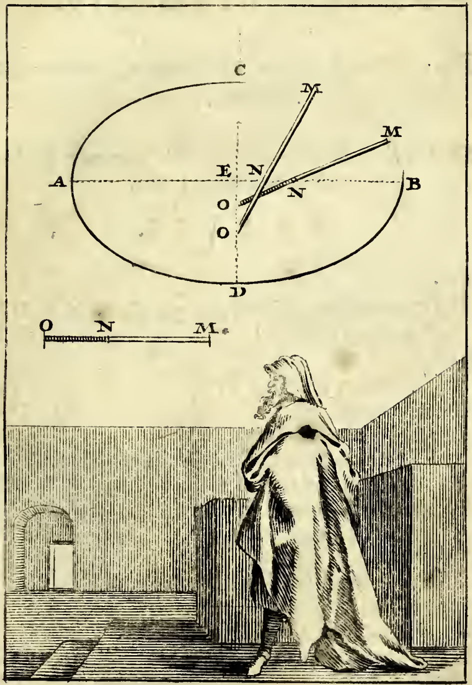
PROPOSITIO XIII.

Super datis duabus diametris Ovalem conſtituere.

Sint AB, CD datæ diametri, ſuper quibus Ovalis ſit conſtituenda.

PRAXIS.

FAc Regulam	MO.
majori ſemi diametro	AE.
æqualem.	
In ea regula ſumatur longitudo	MN.
minori ſemidiametro	CE.
æqualis.	
Quo facto.	
Regulam ita ad diametros	AB, CD.
applica, ut punctum	N.
juxtà rectam	AB.
fluens, regulæ extremitas	O.
numquam rectam	CD.
deſerat.	
Regulæ	MO.
ad hunc modum ductæ, extremitas	M.
Ovalem deſcribet.	


C
M
M
A
E
N
B
N
O
O
D
O
N
M

PROPOSITIO XIV.

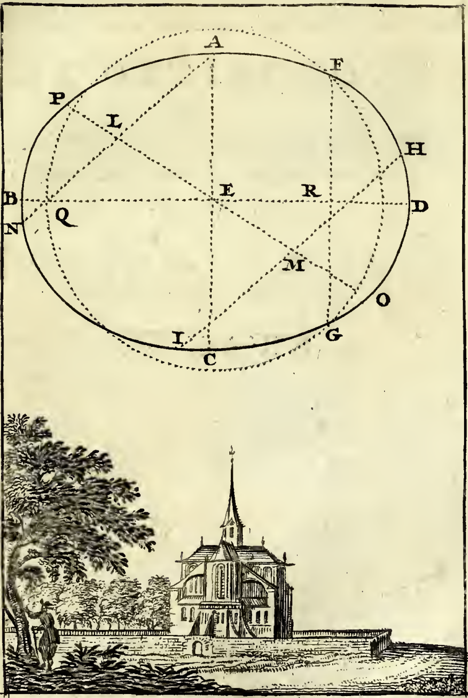
Datæ Ovalis figuræ centrum & diametros invenire.

Sit ABCD data Ovalis cujus & centrum & diametri ſint invenienda.

PRAXIS.

	Ducantur utcumque rectæ parallellæ	AN, HI.
P. 54.	in data Ovali	ABCD.
	Rectæ	AN, HI.
	bifariàm ſecentur in	L & M.
	Ducatur recta	PLMO.
	Eam bifariàm ſeca in	E.
P. 56.	Erit punctum E datæ Ovalis centrum.	
	A dicto centro	E.
	deſcribatur utcunque circulus	FGQ.
	ovalem ſecans in	F & G.
	A ſectione	F,
	ad ſectionem G, ducatur recta.	FG.
P. 56.	Hanc rectam bifariàm ſeca in	R.
	Majorem diametrum	BD.
	duc per puncta	ER.
	A centro	E.
P. 54.	duc minorem diametrum	AEC.
	rectæ	FG.
	parallelam.	

Dico factum quod quærebatur.


A
F
P
L
H
B
E
R
D
Q
N
M
O
I
G
C

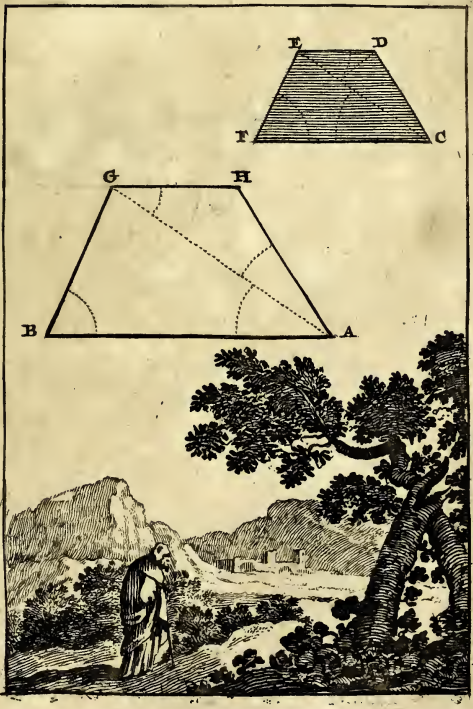
PROPOSITIO XV.

Super data recta finita, figuram rectilineam conſtituere, datæ rectilineæ figuræ ſimilem.

Sit data recta AB, ſuper qua figura conſtituenda ſit datæ CDEF ſimilis.

PRAXIS.

p. 60.	DUcatur diameter	CE.
Ibid.	Fac angulum	ABG.
	angulo	FCE.
	æqualem.	
Ibid.	Pariter angulum	BAG.
	fac æqualem	CFE.
	Erit triangulus	ABG.
	ſimilis triangulo	CFE.
	Fac ſimiliter triangulum	AGH.
	ſimilem triangulo	CED.
	Erit tota figura	ABGH.
	ſimilis	CDEF.


E
D
F
C
G
H
B
A

LIBER TERTIUS DE FIGURAM INSCRIPTIONE.

PROPOSITIO I.

Dato circulo triangulum æquilaterum, Hexagonum, & Dodecagonum inſcribere.

Sit ACD circulus datus cui inſcribendus ſit triangulus æquilaterus &c.

PRAXIS.

Sit primò inſcribendus triangulus æqui angulus.

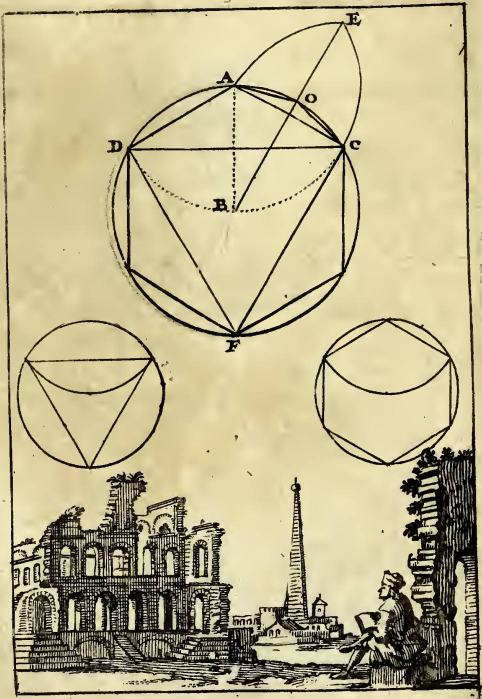
A Quolibet puncto in circumferentia ut A.
ſemidiametri intervallo AB.
deſcribatur arcus CBD.
Ducatur recta DC.
Transferatur iſtud intervallum CD.
à puncto C.
ad punctum F.
Ducantur rectæ FC, FD.
Dico CDF triangulum quæſitum.

Sit verò hexagonus.

Sexies repetita ſemidiameter AB.
dabit hexagonum.

conſtruatur ita dodecagonus.

p. 56. Secetur bifariàm hexagoni arcus AC.
in O.
rit AO Dodedecagoni latus.


E
A
O
D
C
B
F

PROPOSITIO II.

Dato circulo quadratum & octogonum inſcribere.

Sit A B C D circulus cui inſcribendum ſit Quadratum, aut octogonus.

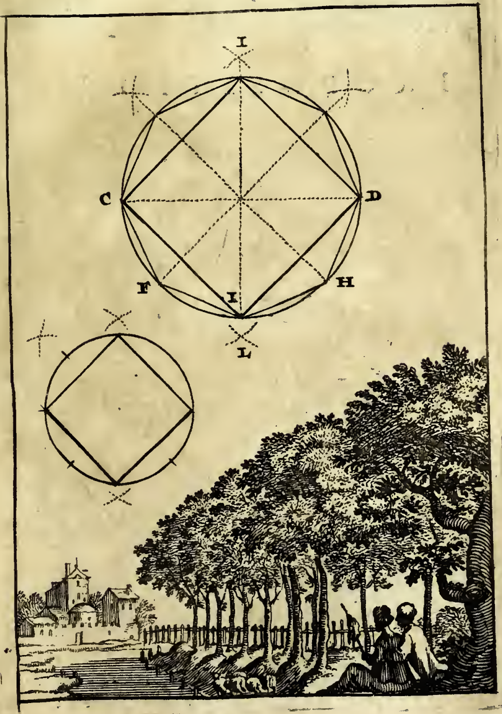
PRAXIS.

Sit primò inſcribendum Quadratum.

DUcantur duæ diametri	AB, CD.
quæ ſe mutuò ſecundum angulos rectos interſecent, id eſt,	
ducatur recta	CD.
per centrum	O.
A punctis ſeu extremitatibus	C & D.
fiant ſectiones	I & L
Tranſeat etiam per centrum	O.
ducta	IL.
Rectæ	AB, CD.
mutuò ſe angulis rectis ſecabunt.	
Ducantur rectæ	AC, AD, BC, BD.
Erit ABCD Quadratum quæſitum.	

DE OCTOGONO.

Secta bifariàm quæque circuli quadrans, dabit octogonum.


I
C
D
F
I
H
L

PROPOSITIO III.

Dato circulo Pentagonum & Decagonum inſcribere.

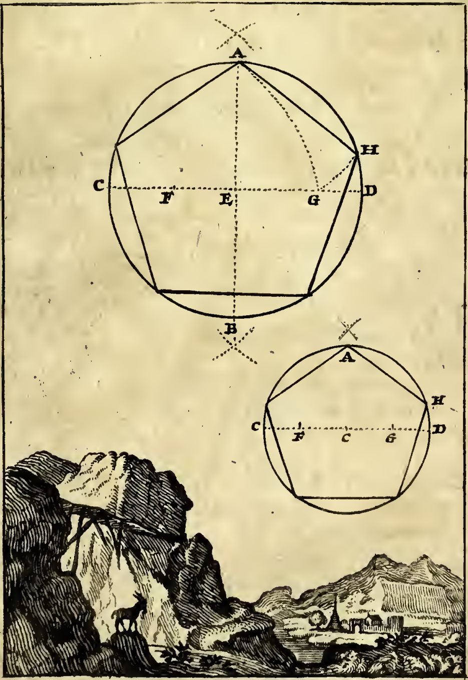
Sit datus circulus ABCD.

PRAXIS.

DUcantur duæ diametri	AB, CD.
angulis ſe rectis interſecantes in	E.
Semidiameter	CE.
bifariàm ſecetur in	F.
Ab hoc puncto	F.
intervallo	FA.
deſcribatur arcus	AG.
A puncto	A.
intervallo	AG.
deſcribatur arcus	GH.
Recta	AH.
erit unum Pentagoni latus.	

DE DECAGONO.

Unamquanque circuli partem bifariàm ſubdivide.


A
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C
F
E
G
D
B
A
H
C
F
C
G
D

PROPOSITIO IV.

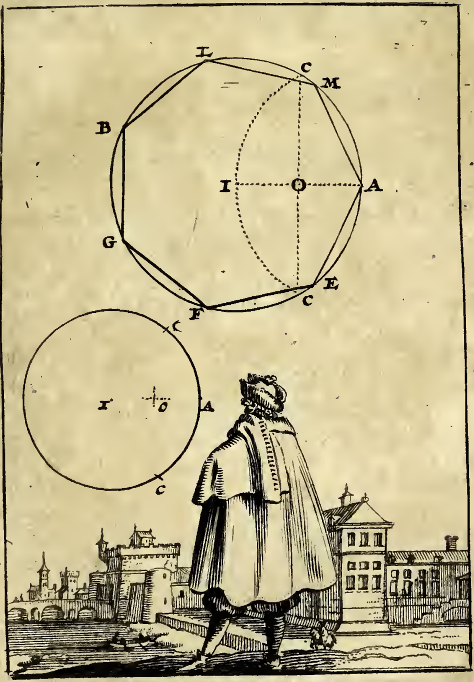
Dato circulo Heptagonum inſcribere.

Sit ABC datus circulus cui ſit inſcribendus Heptagonus.

PRAXIS.

DUcatur ſemidiameter	IA.
Ab extremitate	A.
intervallo	AI.
deſcribatur arcus	CIC.
Ducatur recta	CC.

Dimidium CO rectæ CC, ſepties repetitum in circuli circumferentia, octogonum dabit quæſitum.


L
C
M
B
I
O
A
G
E
C
F
C
I
O
A
C

PROPOSITIO V.

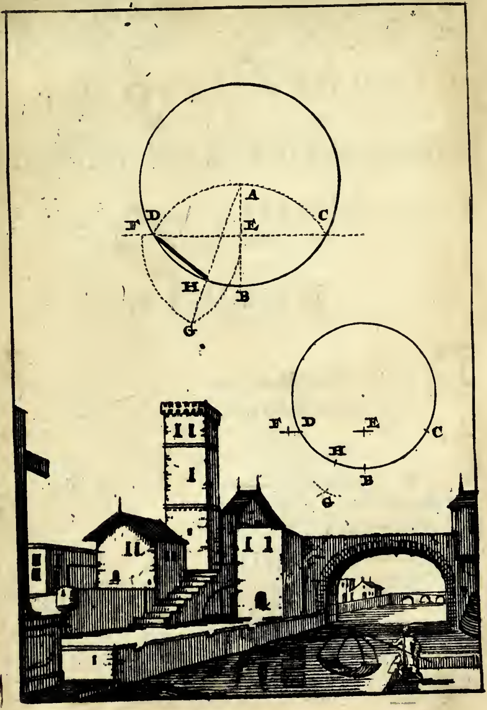
Dato circulo Enneagonum inſcribere.

Sit BCD circulus cui ſit inſcribendus Enneagonus.

PRAXIS.

DUcatur ſemidiameter	AB.
Ab extremitate	B.
intervallo	BA.
deſcribatur arcus	CAD.
Ducatur recta	CD.
producta in	F.
Sumatur recta	EF.
rectæ æqualis	AB.
A puncto	E.
deſcribatur arcus	FG.
A puncto	F.
deſcribatur arcus	EG.
Ducatur recta	AG.

DH novies in circumferentia circuli repetita, quæſitum dabit Enneagonum.


A
D
C
F
E
H
B
G
F
D
E
C
H
B
G

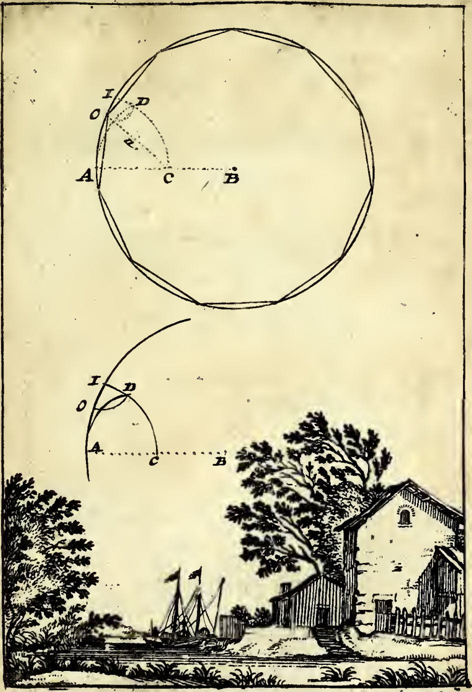
PROPOSITIO VI.

Dato circulo Hendecagonum inſcribere.

Sit datus circulus A E F cui inſcribendus ſit Hendecagonus.

PRAXIS.

DUcatur ſemidiameter	A B.
ſeceturque bifariàm in	C.
A punctis	A & C.
intervallo	A C,
deſcribantur arcus	CDI, A D.
A puncto	I.
intervallo	I D.
deſcribatur arcus	D O.
Intervallum	C O.
erit latus unum Hendecagoni.	


I
D
O
a
A
C
B
I
D
O
A
C
B

PROPOSITIO VII.

Dato circulo quemlibet Polygonum inſcribere.

Sit B A C circulus cui inſcribendus ſit Heptagonus.

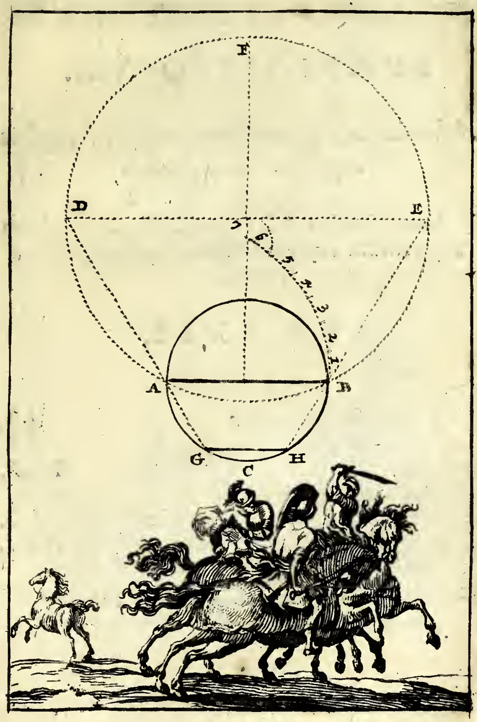
PRAXIS.

p. 82. DUcatur diameter AB.
84. Ducatur circulus ABF;
p. 86. 88. qui rectam A B capiat ſepties.

p. 54. *Quaſi ſuper A B polygonus ſit conſtituendus ei ſimilis, qui circulo dato inſcribendus eſt.*

Ducatur diameter DE.
diametro A B parallela.
Per extremitates D & A, E & B
ducantur rectæ DAG, EBH.
Recta G H datum circulum ABC.
in 7 æquales partes ſecabit.

Et ſic de cæteris omnibus Polygonis.


F
D
E
7
6
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4
3
2
1
A
B
G
H
C

PROPOSITIO VIII.

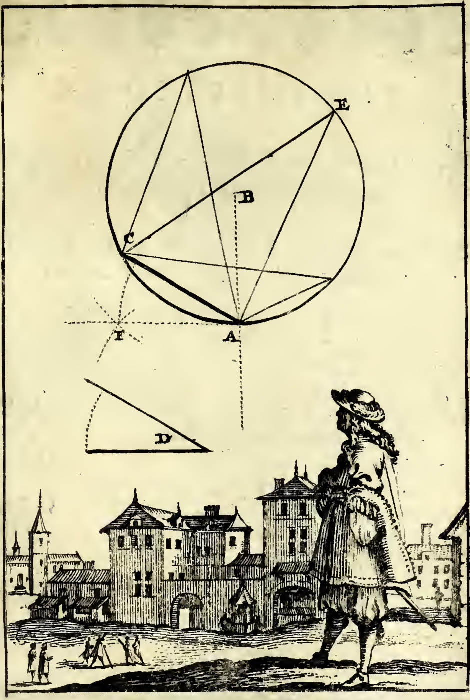
A dato circulo ſegmentum auferre, capiens angulum dato parem.

Sit datus circulus ACE, à quo ſit auferendum ſegmentum capiens angulum dato angulo D. parem.

PRAXIS.

Ducatur ſemidiameter	AB.
p. 64. Ducatur porrò tangens	AF.
Angulum	FAC.
fac dato D. æqualem.	
Erunt anguli quilibet, ſuper recta	AC.
conſtituti, & in ſegmento	AEC.
dato D æquales.	

Eſt itaque AEC ſegmentum quod quæritur


E
B
C
F
A
D

PROPOSITIO IX.

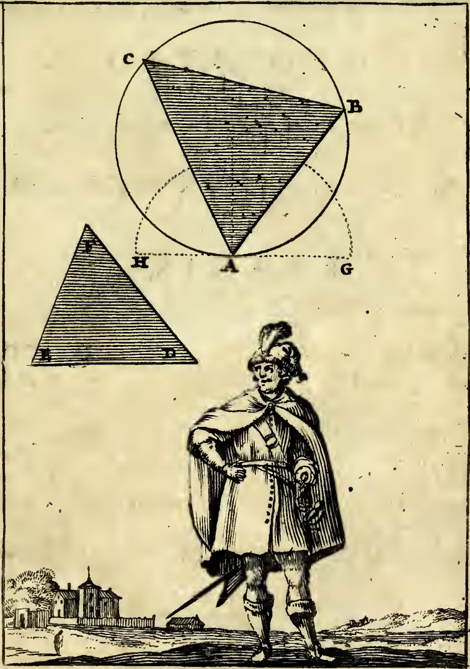
Dato circulo triangulum, dato triangulo æquiangulum, inſcribere.

Sit datus circulus A B C, cui inſcribendus ſit triangulus dato triangulo D E F ſimilis.

PRAXIS.

p. 64.	DUcatur tangens	G H.
	Ab ipſo contactus puncto	A.
	fac angulum	H A C.
p. 60.	æqualem angulo	E.
	Fac porrò angulum	G A B.
	æqualem angulo	D.
	Duc rectam	B C.

Erit A B C quæſitus triangulus, dato D E F. ſimilis.


C
B
H
A
G
E
D

PROPOSITIO X.

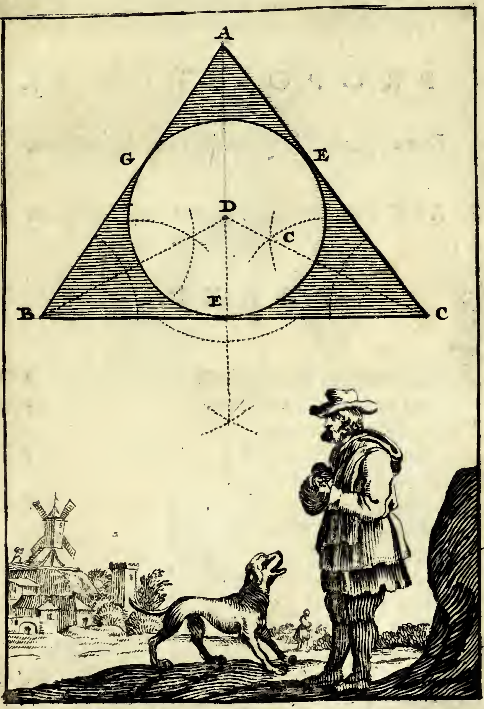
Dato triangulo circulum inſcribere.

Sit A B C triangulus, cui inſcribendus ſit circulus.

PRAXIS.

p. 58.

REctis	BD, CD.
angulos	B & C
æqualiter biſeca.	
A puncto interſectionis	D.
duc perpendicularem	D F.
ſuper B C.	
A puncto interſectionis ſeu centro	D.
intervallo	D F.
Deſcribatur quæſitus circulus.	E F G.


A
G
E
D
C
F
B
C

PROPOSITIO XI.

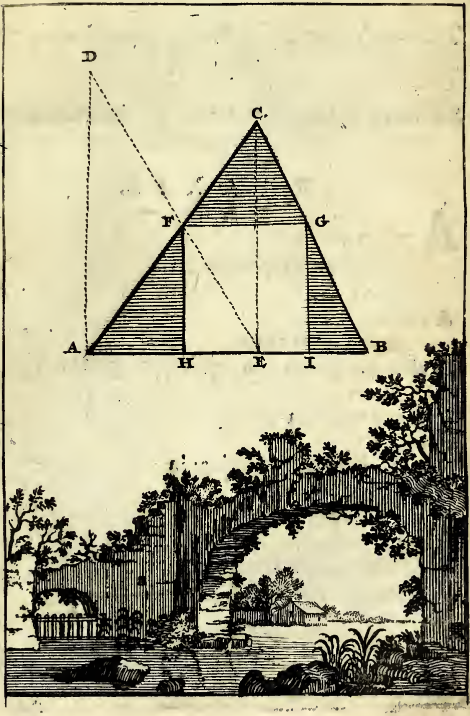
Dato triangulo Quadratum inſcribere.

Sit ABC datus triangulus, cui inſcribendum ſit Quadratum.

PRAXIS.

p. 48.	EXcitetur perpendicularis	AD.
	ad extremitatem baſis	AB.
	Perpendicularem autem	AD.
	ſume æqualem baſi	AB.
	Ducatur à vertice anguli	C.
	recta	CE.
p. 54.	rectæ AD parallela.	
	Ducatur obliqua	DE.
	A puncto ſectionis	F.
p. 54.	Ducatur recta	FG.
	baſi AB parallela.	
	Ducantur rectæ	FH, GI.
p. 54.	parallelæ rectæ	CE.

Erit FGHI quæſitum Quadratum.


D
C
F
G
A
H
E
I
B

PROPOSITIO XII.

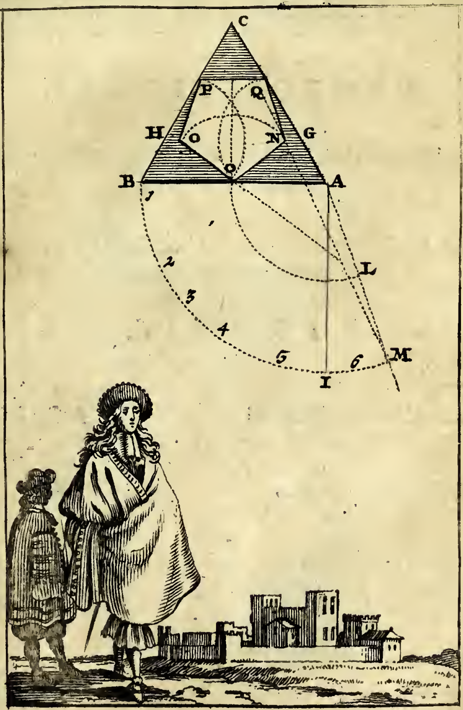
Triangulo æquilatero Pentagonum ordinatum inſcribere.

Sit datus triangulus A B C cui inſcribendus ſit Pentagonus.

PRAXIS.

A Puncto	A.
excitetur perpendicularis	AI.
ſuper	AB.
A centro	A.
deſcribatur arcus	BIM.
Dividatur porrò in quinque partes æquales arcus	BI.
Addatur & ſexta	IM.
Ducatur	AM.
p.56. & dividatur biſeriam in	L
A puncto	A.
deſcribatur arcus	LD.
Ducatur recta	LD in H.
ſumatur pars	AG.
æqualis parti	BH.
Ducantur rectæ	DG, MC.
A centro	D
intervallo ſectionis	N.
deſcribatur arcus	N O.
A centris	N & O.
deſcribantur arcus	DQ. DP.
Ducantur rectæ	OP, PQ, NQ.

Erit DOPQN quæſitus Pentagonus.


C
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PROPOSITIO XIII.

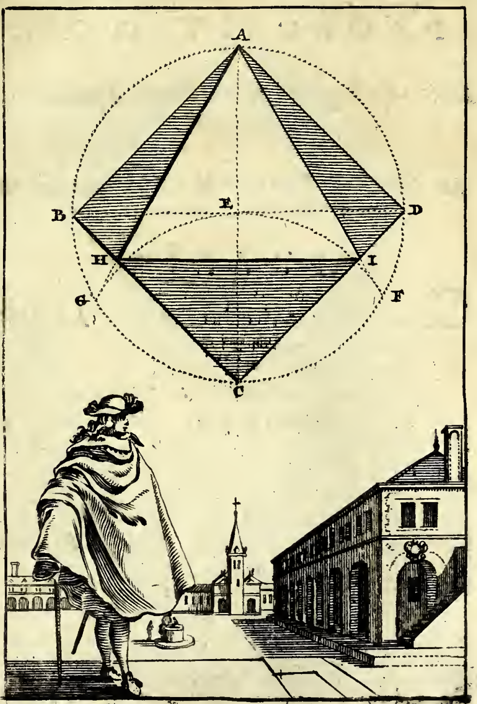
Dato cuilibet Quadrato triangulum æquilaterum inſcribere.

Sit ABCD Quadratum cui inſcribendus ſit triangulus æquilaterus.

PRAXIS.

Ducantur diametri	AC, BD.
A centro	E.
intervallo	EA.
deſcribatur circulus	ABCD.
A puncto	C
intervallo	CE.
deſcribatur arcus	GEF.
Ducantur rectæ	AF, AG.
Ducatur porrò recta	HI.

Erit AHI quæſitus triangulus.


A
B
E
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C

PROPOSITIO XIV.

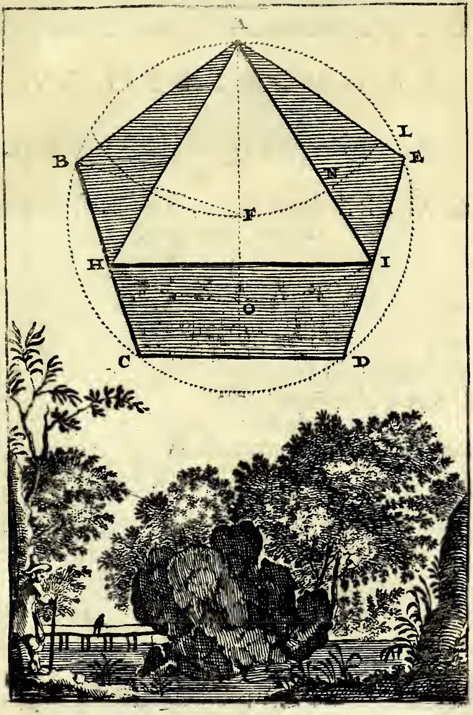
Dato Pentagono triangulum æquilaterum inſcribere.

Sit ABCDE Pentagonus cui inſcribendus ſit triangulus æquilaterus.

PRAXIS.

p. 96.	Circumſcribatur circulus	ABCDE.
	A puncto	A.
	intervalloque ſemidiametri	AF.
	deſcribatur arcus	FL.
	quem bifariam ſeca in	N.
	Ducatur recta	ANI.
	A puncto	A.
	intervallo	AI
	deſcribatur arcus	IOH.
	Ducantur rectæ	AH, HI,

Erit AHI quæſitus triangulus,


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PROPOSITIO XV.

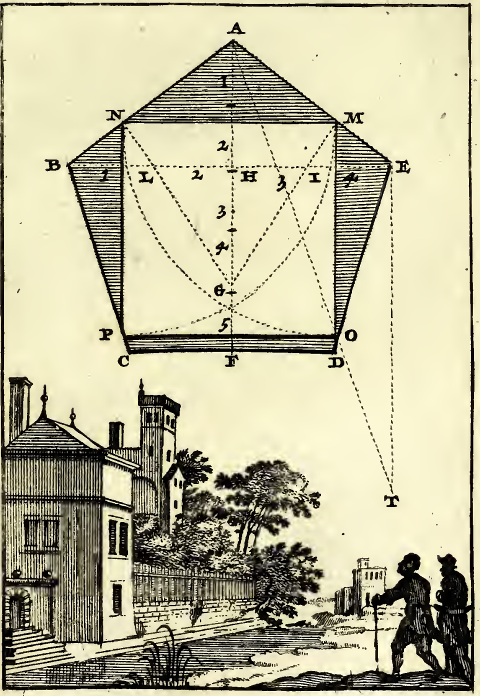
Dato Pentagono Quadratum inſcribere.

Sit ABCDE datus Pentagonus, cui inſcribendum Quadratum.

PRAXIS.

p. 52.	DUcatur recta	BE.
	Ducatur ad extremitatem	BE.
	perpendicularis	ET.
	Sumatur ducta perpendicularis	ET.
	æqualis rectæ	BE.
	A puncto ſectionis	O.
p. 54.	ducatur recta	OP.
	lateri	CD.
	parallela.	
p. 48.	Ad extremitates	O & P.
	excitentur perpendiculares	OM, PN.
	Ducatur recta	NM.

Dico NMOP. Quadratum quæſitum.


A
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T

LIBER QUARTUS

IN QUO

DE

FIGURARUM

CIRCUMSCRIPTIONE.

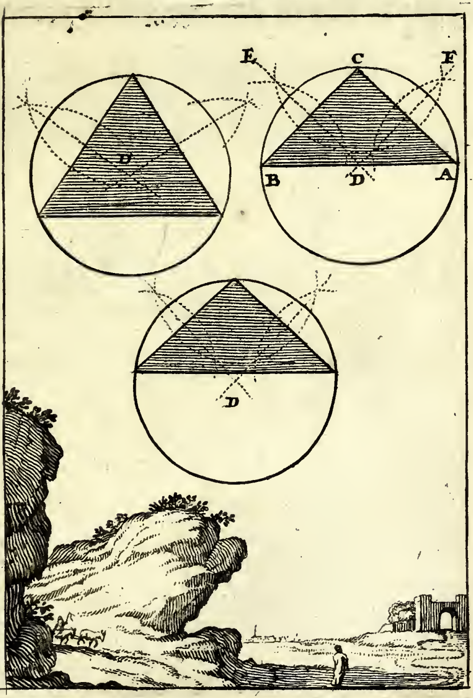
LIBER QUARTUS.

PROPOSITIO I.

Dato triangulo circulum circumſcribere.

Sit A B C datus triangulus, cui circulus circumſcribendus.

p. 96. DEſcribatur circumferentia A B C. per tria puncta A, B, C. tranſiens. Dico factum.

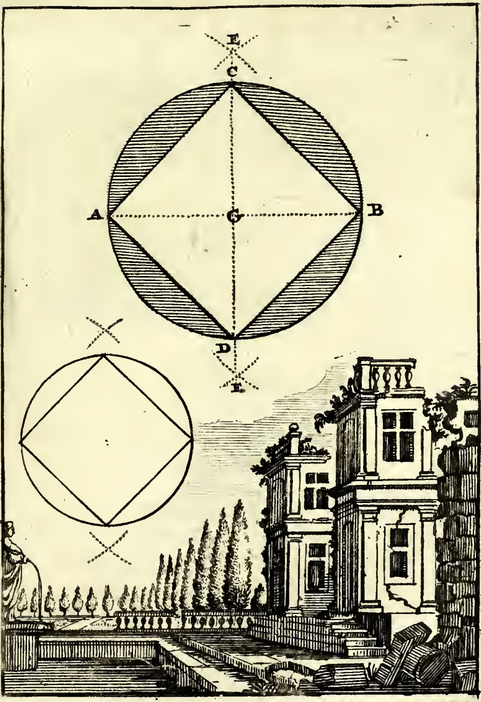

E
C
F
D
B
D
A
D

PROPOSITIO II.

Dato Quadrato circulum circumſcribere.

PRAXIS.

DUcantur diametri	AB, CD.
A puncto ſectionis ſeu centro	G.
intervallo	GA.
Deſcribatur circulus quæſitus	ABCD.


E
C
A
G
B
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E

PROPOSITIO III.

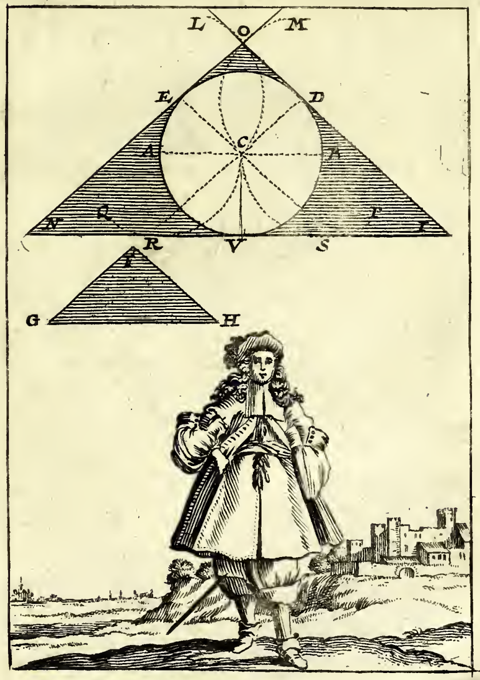
Dato circulo triangulum circumſcribere, dato triangulo æquiangulum.

Sit D E V circulus, cui triangulus circumſcribendus ſit, dato triangulo æquiangulus.

PRAXIS.

	DUcatur per centrum	C.
	diameter	AB.
p. 60.	Angulum	ACE.
	fac æqualem angulo	H.
p. 60.	Angulum verò	BCD.
	æqualem	G.
	Producantur verſus	R & S.
	rectæ	EC, DC.
p. 54.	Ducatur tangens	NO.
	parallela rectæ	DR.
p. 54.	Ducatur tangens	OI.
	parallela rectæ	ES.
p. 54.	Ducatur porrò tangens	NI.
	parallela diametro	AB.

Erit I N O quæſitus triangulus, triangulo F G H ſimilis, circulo D E V circumſcriptus.


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PROPOSITIO IV.

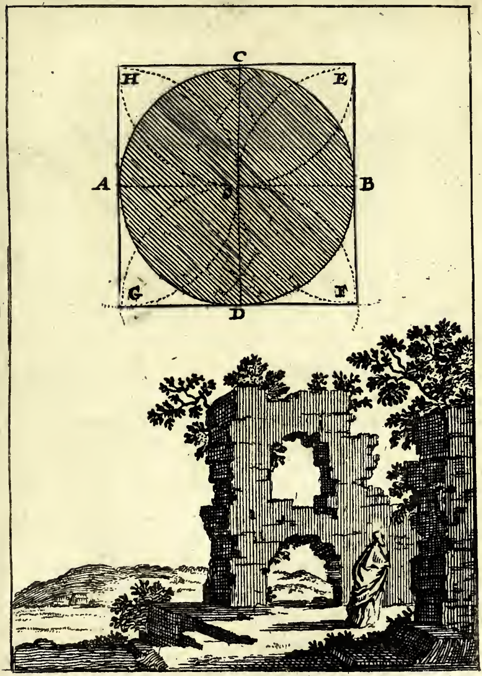
Dato circulo Quadratum circumſcribere.

Sit A B C D circulus, cui circumſcribendum Quadratum.

PRAXIS.

Ducantur diametri	AB, CD.
mutuò ſe angulis rectis ſecantes in	O.
A punctis	A, C, B, D.
intervallo	AO.
Ducantur ſemicirculi	HOG, HOE.
	EOF, FOG.
Ducantur rectæ	EF, FG, GH, HE.
per ſectiones	E, F, G, H.

Erit E F G H quæſitum Quadratum.


C
H
E
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B
G
F
D

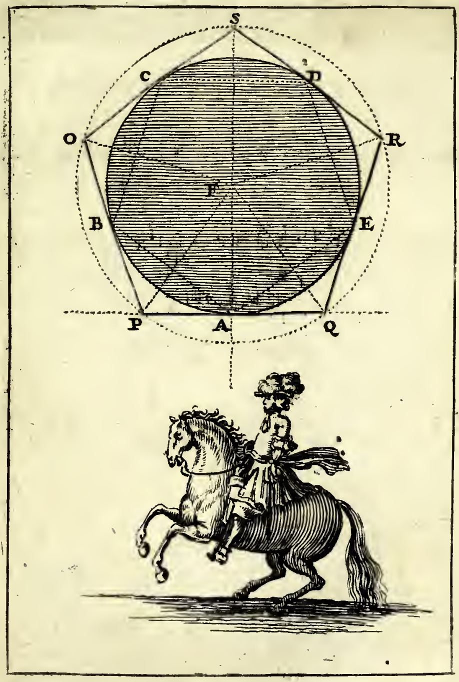
PROPOSITIO V.

Dato circulo Pentagonum circumſcribere.

Sit Pentagonus ABCDE, cui circumſcribendus ſit Pentagonus.

PRAXIS.

	INſcribatur Pentagonus	ABCDÆ.
p.112	A centro	F.
	Per medium ſingulorum inſcripti pentagoni laterum ducantur rectæ FO, FP, FQ, FR, FS.	
p. 66.	Ducatur recta	FA.
	Ducatur tangens	PQ.
	per punctum	A.
	A centro	F.
	intervalloque	FP.
	deſcribatur circulus	OPQRS.
	Ducantur quæſiti Pentagoni latera per ſingula ſectionum puncta	OPQRS.


S
C
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Q

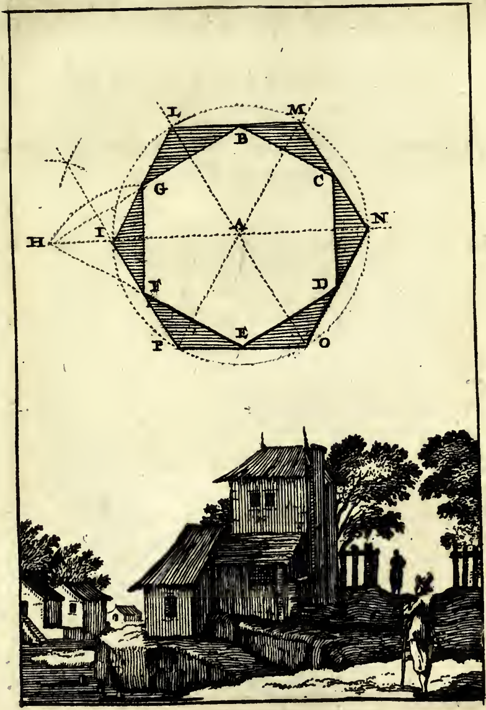
PROPOSITIO VI.

Ordinato cuilibet Polygono, ſimilem Polygonum circumſcribere.

Sit B C D E F G datus Polygonus, cui alius ſimilis Polygonus ſit circumſcribendus.

PRAXIS.

PRoducantur duo latera e. gr.	BG, EF.
donec concurrant in	H.
Ducatur recta	AH.
p. 58. Ducatur porrò recta	FI.
bifariàm ſecans angulum	GFH.
A centro	A.
intervallóque	AI.
deſcribatur circulus	IMO.
Ducantur ſemidiametri	AL, AM, AN, AO.
per media quæque dati Polygoni latera.	
Ductæ per puncta ſectionum	ILMNOP.
rectæ, dabunt quæſitum Polygonum.	


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PROPOSITIO VII.

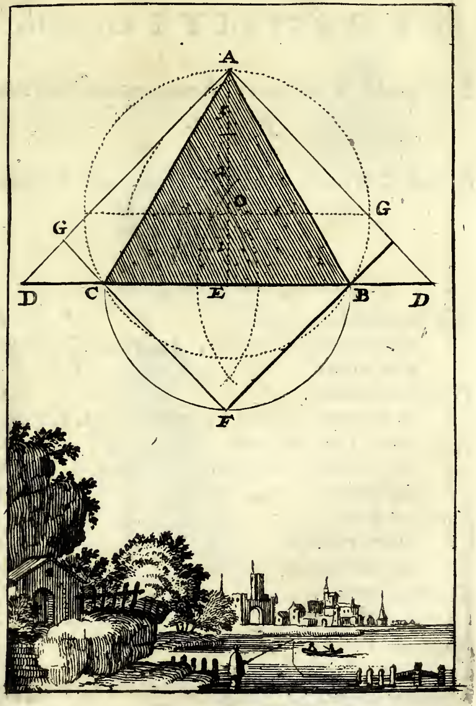
Triangulo æquilatero Quadratum circumſcribere.

Sit A B C triangulus æquilat. cui circumſcribendum Quadratum.

PRAXIS.

	SEcetur biſariàm baſis	B C.
p. 56.	in	E.
	Illa autem baſis utrinque producatur verſùs	D & D.
	Rectas	E D, E D.
	ſume æquales rectæ	A E.
	A puncto	E.
	intervallo	E C.
	deſcribatur ſemicirculus	B F C.
	Ducatur recta	A E F.
	Ducantur à puncto	F.
	rectæ	F C G, F B G.

Erit A G F G quæſitum quadratum.


A
O
G
G
D
C
E
B
D
F

PROPOSITIO VIII.

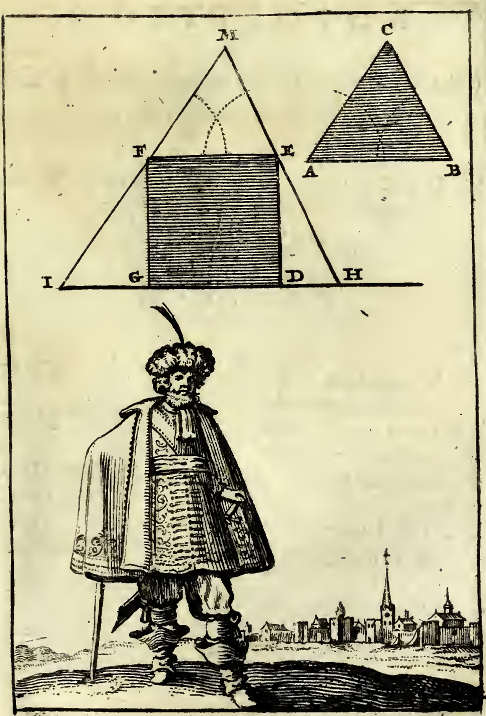
Triangulo æquilatero Pentagonum circumſcribere.

Sit ABC triangulus æquilaterus, cui Pentagonus ſit circumſcribendus.

PRAXIS.

A Punctis ſeu angulis	A, B, C.
eodemque intervallo, deſcribantur utcunque arcus	DE, LP.
Dividatur arcus	DO.
in quinque partes æquales	1. 2. 3. 4. 5.
A centro, ſeu ſectione	O.
intervallo 4. partium	ON.
deſcribatur arcus	NME.
Ducatur recta	AEF.
ſecetur arcus	MP.
æqualis arcui	EN.
Ducatur recta	EPCG.
æqualis rectæ	FA.
Sumatur arcus	DH.
æqualis arcui	DE.
Ducantur latera	AI, IR.
æqualia lateribus	AF, FG.

Dico GR pentagoni quæſiti eſſe latus unum.


M
C
F
E
A
B
I
G
D
H

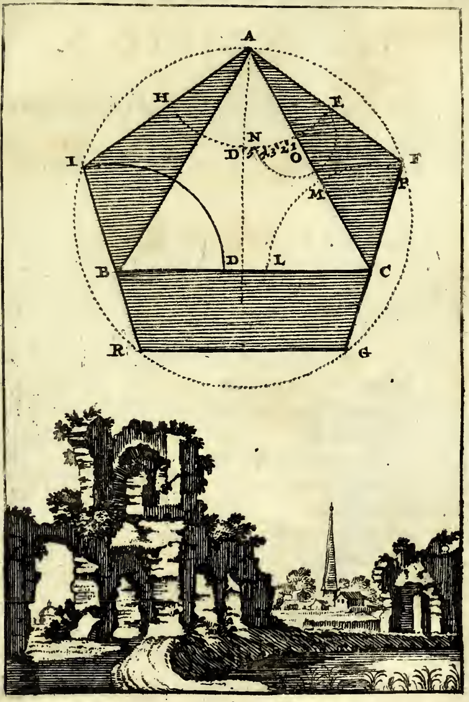
PROPOSITIO IX.

Quadrato triangulum æquiangulum, dato æqualem, circumſcribere.

Sit D E F G Quadratum cui triangulus ſit circumſcribendus, dato triangulo A B C, ſimilis.

PRAXIS.

p. 60.	FAc angulum æqualem angulo	EF M. A.
p. 60.	Fac ſimiliter angulum æqualem angulo	MEF. B.
	Producantur rectæ verſus	ME, MF, DG. I & H.
	Erit MIH quæſitus triangulus, dato ſimilis, Quadratoque circumſcriptus	ABC. DEFG.


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R
G

PROPOSITIO X.

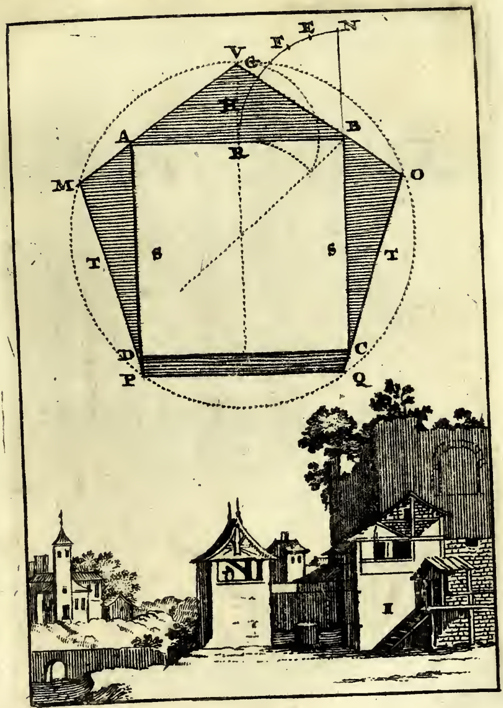
Quadrato circumſcribere Pentagonum.

Sit ABCD Quadratum cui circumſcribendus ſit Pentagonus.

PRAXIS.

	PRoducatur	GB.
	verſùs	N.
p. 56.	Latus	AB.
	bifariàm ſecetur in	R.
p. 44.	Excitetur perpendicularis	RV.
	A punctis	B, D, C.
	eodemque intervallo	BR.
	deſcribantur arcus	RN, ST, ST.
	Dividatur arcus	RN.
	in quinque partes æquales	RHGFEN.
	Fac angulum	RBV.
	ita ut latera diſtent duabus partibus	RG.
	Angulis verò	SCT, SDT.
	da magnitudinem unius partis	RH.
	Rectæ	VB, CT.
	producantur in	O.
	Sume rectam	OQ.
	æqualem rectæ	OV.

Ducantur ad hunc modum cætera latera; habebis quæſitum Pentagonum.


V
G
F
E
N
H
A
B
R
M
O
S
S
T
T
D
C
P
Q
I

LIBER QUINTUS

IN QUO

DE

LINEIS

PROPORTIONALIBUS.

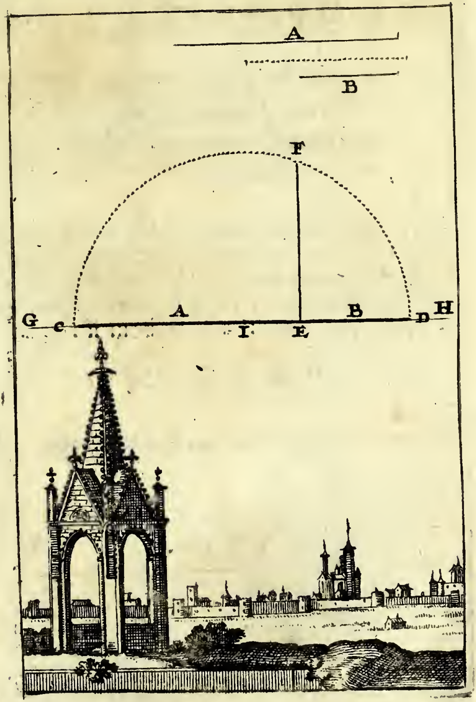
PROPOSITIO I.

Inter duas datas rectas mediam invenire proportionalem.

Sint datæ rectæ A B C quas inter invenienda media proportionalis.

PRAXIS.

DUcatur linea infinita	GH.
Sumatur	CE.
æqualis rectæ	A.
Sumatur	ED.
æqualis rectæ	B.
p. 56. Recta	CD.
biſariàm ſecetur in	I.
Ab hoc puncto	I.
intervallo	IC.
deſcribatur ſemicirculus	CFD.
Excitetur perpendicularis	EF.
Dico rectam	EF.
mediam eſſe proportionalem inter	A & B.
Quod EF.	


A
B
F
G
C
A
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H
I
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PROPOSITIO II.

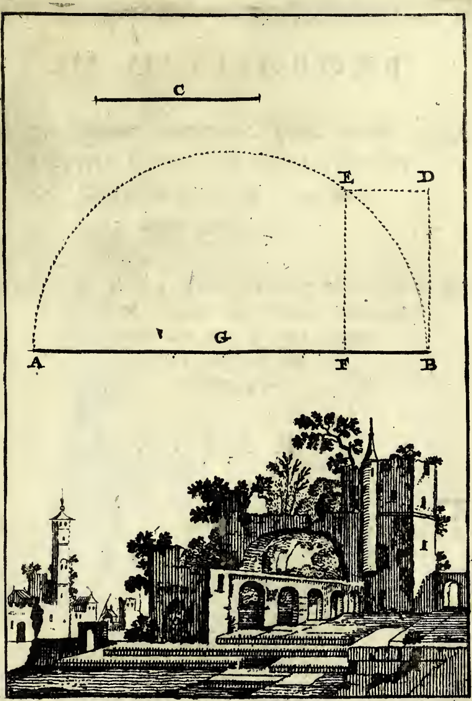
Datâ, in qualibet proportione, extremorum terminorum ſummâ & media proportionali, extremos ſingulos invenire.

Sit A B extremorum ſumma (i. e. duæ magnitudines junctæ, ſine ulla diſtinctione) quarum magnitudinum ſeu linearum, recta C. ſit media proportionalis, cujus ope punctum, quo extremi junguntur, inveniendum ſit.

PRAXIS.

p. 56.	SEcetur bifariàm ſumma, ſeu tota recta	A.
	in	G.
	A quo puncto	G.
	intervallóque	GA.
	deſcribatur ſemicirculus	AEB.
p. 54.	Excitetur perpendicularis	BD.
	mediæ C æqualis.	
p. 54.	Ducatur recta	DE.
	parallela rectæ	AB.
	A ſectione	E.
	ducatur recta	EF.
	parallela rectæ	BD.

Erit F punctum, quo extremi termini junguntur. Erit itaque C. aut ipſi æqualis EF. media proportionalis inter extremos AF & FB


C
E
D
G
A
F
B

PROPOSITIO III.

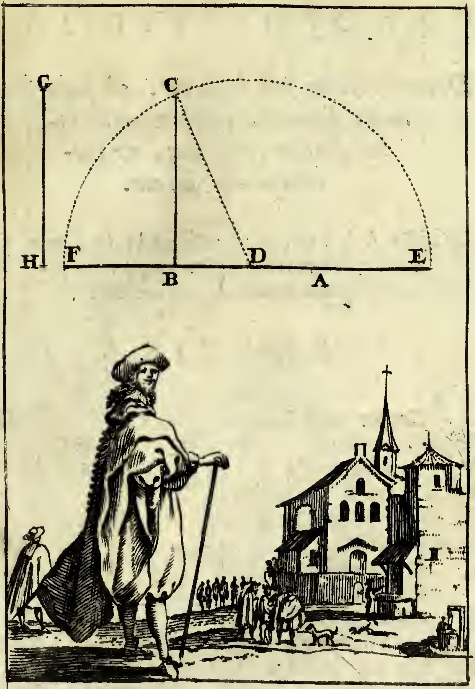
Datâ inter duos terminos mediâ proportionali, ut & differentiâ extremorum, utrumque invenire extremum.

Sit G H media proportionalis, A B verò extremorum differentia, ſeu exceſſus quô unum extremum alter excedit: Inveniendi ſunt extremi.

PRAXIS.

p. 48.	Excitetur perpendicularis	B C.
	ad extremitatem differentiæ	A B.
	æqalis mediæ prop.	G H.
p. 56.	Secetur differentia	A B.
	bifariàm in	D.
	Producatur utrinque iſta differentia verſus	E & F.
	A puncto	D.
	atque intervallo	D C.
	deſcribatur ſemicirculus	E C F.

Erunt B E, B F. quæſiti extremi.


G
C
H
F
D
E
B
A

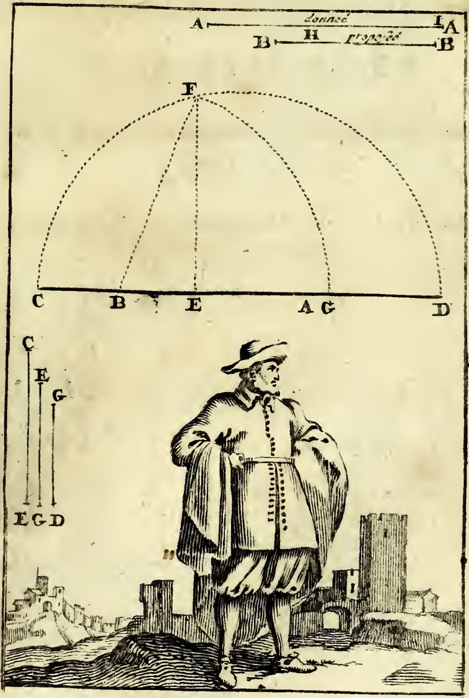
PROPOSITIO IV.

Datam rectam ita biſecare, ut pars illius una, ſit media proportionalis inter partem reliquam, & rectam aliam datam.

Sit recta A A à qua pars reſecanda ſit, quæ ſit media proportionalis inter partem reliquam & datam rectam BB.

PRAXIS.

	DUcatur recta infinita	CD.
	Secentur rectæ	DE, EC.
	æquales rectis	A A & B B;
	Deſcribatur ſemicirculus	CFD.
p. 44.	Excitetur perpendicularis	EF.
	Secetur recta	CE.
p. 56.	biſariàm in	B.
	Ab hoc puncto	B.
	atque intervallo	BF.
	deſcribatur arcus	FG.
	Sumatur pars quæſita	AH.
	æqualis parti	EG.
	Dico A H mediam eſſe proportionalem	inter
	partem reliquam	HI.
	& datam alteram	BB.


A
donné
I
A
B
H
propoſé
B
F
C
B
E
A G
D
C
E
G
E G D

PROPOSITIO V.

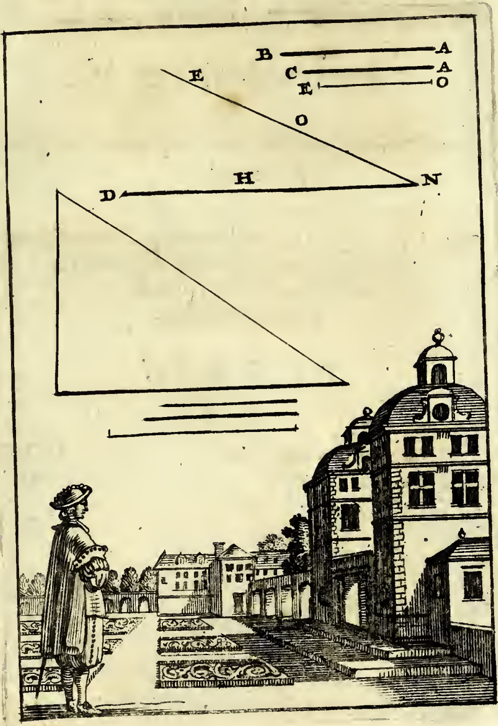
Datis duabus rectis invenire tertiam proportionalem.

Sint AB, AC duæ datæ rectæ; invenienda tertia proportionalis.

PRAXIS.

FAc utcunque angulum	DNE.
Partem	NH.
ſume æqualem rectæ	AB.
Partem	NO.
ſume æqualem rectæ	AC.
ſume prætereà	HD.
æqualem	AC.
Duc rectam	HO.
Duc porro rectam	DE.
parallelam rectæ	HO.

Dico E O tertiam perportionalem.


B
A
C
A
E
O
E
O
H
N
D

PROPOSITIO VI.

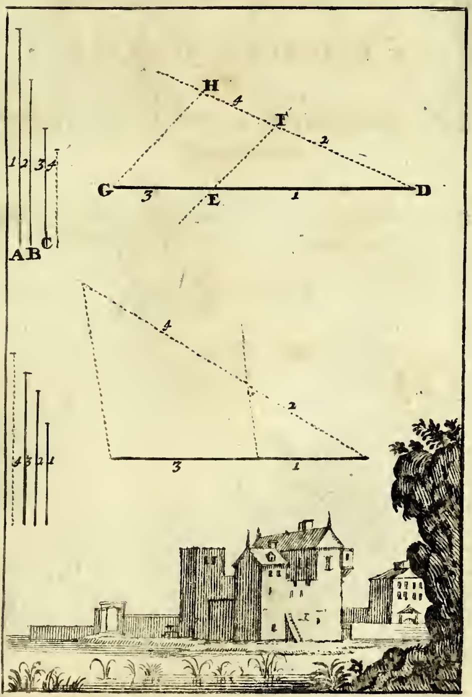
Datis tribus rectis quartam invenire proportionalem.

Sint A, B, C, tres datæ rectæ, quarta invenienda eſt, quæ eandem ad tertiam rationem habeat, quam ad primam ſecunda.

PRAXIS.

FAc utcunque angulum	GDH.
Seca partem	DE.
æqualem rectæ	A.
Seca porrò partem	DF.
æqualem rectæ	B.
& partem	EG.
æqualem rectæ	C.
p. 54. Duc rectam	EF.
Duc rectam	GH.
parallelam rectæ	EF.

Erit F H quarta proportionalis quæſita.


H
4
F
2
G
3
E
1
D
1 2 3 4
A B C
4
2
3
1
4 3 2 1

PROPOSITIO VII.

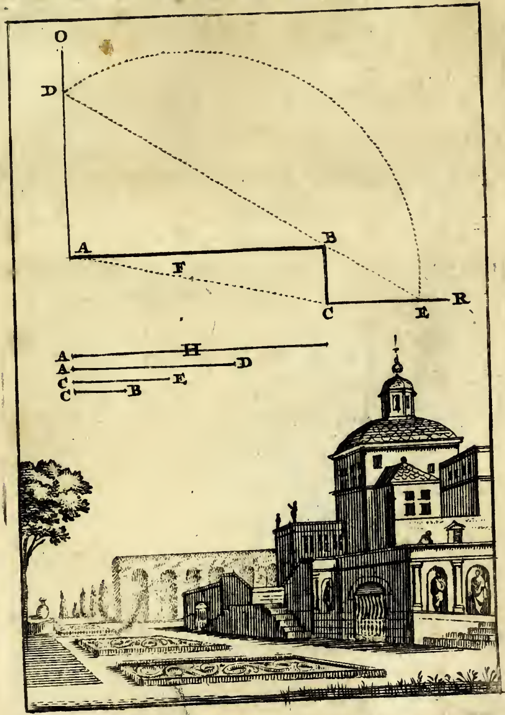
Inter datas rectas, medias proportionales duas invenire.

Sint datæ rectæ I & H; quas inter mediæ proportionales duæ ſint inveniendæ.

PRAXIS.

	DUcatur recta	A B.
	æqualis rectæ	H.
	Deducatur perpendicularis	B C.
	æqualis rectæ	I.
	Ducatur recta	A C.
p. 56.	Secetur	A C.
	bifariàm in	F.
p. 48.	Excitentur perpendiculares	A O, C R.
	A puncto ſeu centro	F.
	deſcribatur arcus	D E.
	ita ut ſubtenſa arcui	D E.
	tangat angulum	B.

Erunt A D, C E mediæ proportionales inter datas I & H.


O
D
A
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R
A
H
A
D
C
E
C
B

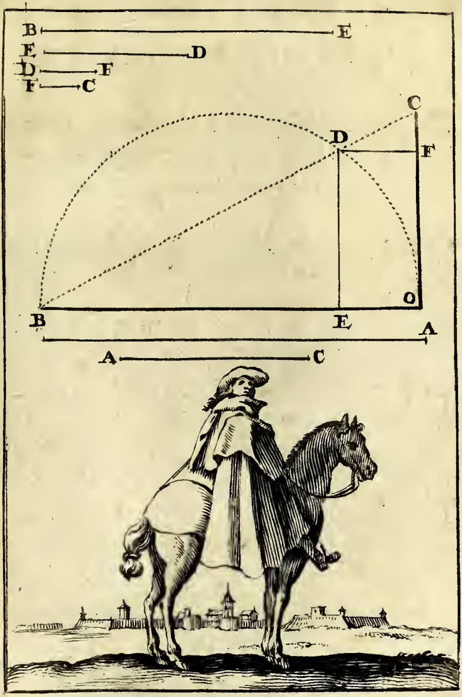
PROPOSITIO VIII.

Datas duas rectas ita ſingulas biſecare ut quatuor ſegmenta ſint proportionalia.

Sint A B, A C datæ juxta propoſitionem biſecandæ.

PRAXIS.

	FAc angulum rectum	B O C.
	Sume rectam	B O.
	æqualem rectæ	A B.
	Seca rectam	O C.
	æqualem rectæ	A C.
p. 54.	Duc ſubtenſam	B C.
	Deſcribatur ſemicirculus	B D O.
p. 54.	A puncto ſectionis	D.
	ducatur recta	D E.
	parallela rectæ	C O.
	Recta itidem	D F.
	parallela rectæ	E O.
	Secabitur A B in	E.
	O C verò in	F.
	& ita quidem ut	B E, E D : : E D, D F.
	rurſùs	E D. D F : : D E. F C.


B E
E D
D F
F C
C
D
F
O
B
E
A
A C

PROPOSITIO IX.

Datâ quantitate, quâ Diameter Quadrati Latus quadrati excedit, dicti lateris longitudinem invenire.

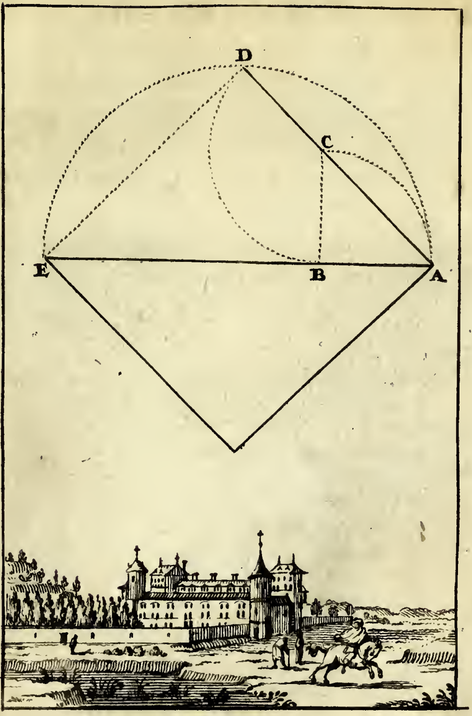
Sit A B exceſſus diametri ſupra Quadrati latus. Inveniendum illud latus.

PRAXIS.

EXcitetur perpendicularis	B C.
æqualis exceſſui	B A.
Ducatur recta	A C.
producta in	D.
A puncto	C.
p. 48. atque intervallo	C B.
deſcribatur arcus	B D.

Erit A D Quadrati illius latus, cujus diameter

ter	A E.
latus	A D.
excedit, quantitate	A B.


D
C
E
B
A

PROPOSITIO X.

Datam rectam ita ſecare, ut tota ſit ad unum ſegmentum, ſicut idem ſegmentum eſt ad reliquum; ſeu (ut Geometræ loquuntur) lineam extremâ ac mediâ ratione ſecare.

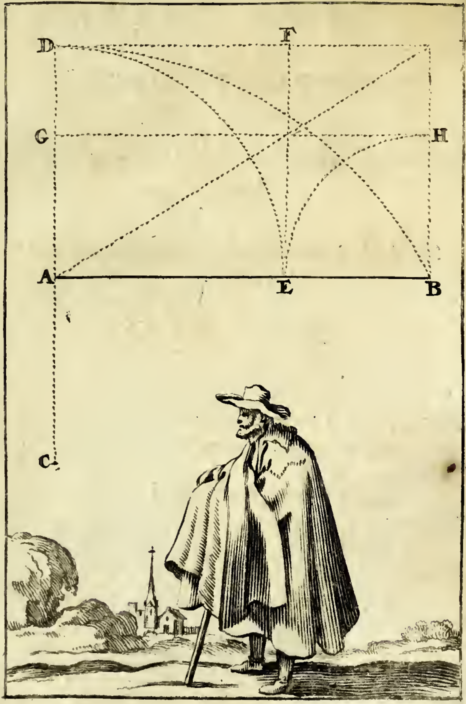
Sit recta A B extrema ac media ratione ſecanda.

PRAXIS.

p. 48. EXcitetur perpendicularis	A D.
producaturque ad	C.
Sumatur	A C.
æqualis dimidio rectæ	A B.
A puncto	C.
intervallo	C B.
deſcribatur arcus	B D.
A puncto	A.
intervallo	A D.
deſcribatur arcus	D E.

Dico rectam	A B.
ſectam eſſe in	E.

juxta propoſitionem. Si enim Rectangulum A H conſtituas ex tota A B, & parte B E. Erit illud rectangulum æquale Quadrato alterius partis A E.


D
F
G
H
A
E
B
C

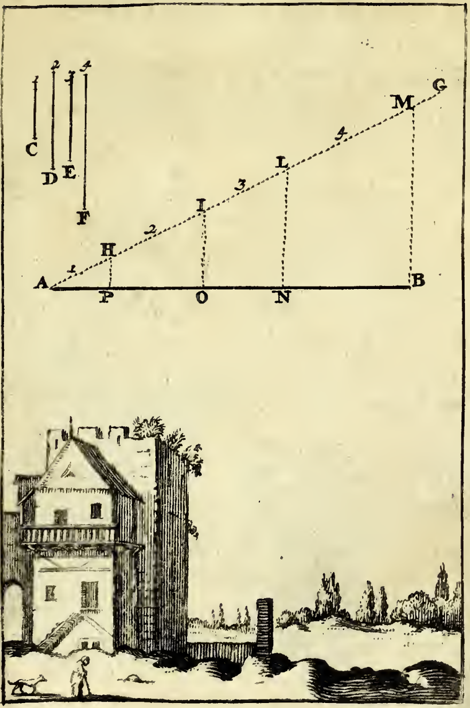
PROPOSITIO XI.

Rectam finitam ſecundùm datas rationes ſecare.

Sit data A B ſecanda ſecundum rationes C, D, E, F.

PRAXIS.

	A Puncto ſeu extremitate	A.
	ducatur utcunque recta	A G.
	Sumatur	A H.
	æqualis rectæ, ſeu rationi	C.
	Sumatur	H I.
p. 48.	æqualis rectæ	D.
	Sumatur	I L.
	æqualis rectæ	E.
p. 56.	Sumatur porrò	L M.
	æqualis rectæ	F.
	Ducatur recta	B M.
	Ducantur prætereà rectæ	L N, I O, H P.
	parallelæ rectæ	B M.
	Dico A B in punctis	P, O, N.
	ſectam ut quærebatur.	


1
2
3
4
C
D
E
F
G
M
4
L
3
I
2
H
1
A
P
O
N
B

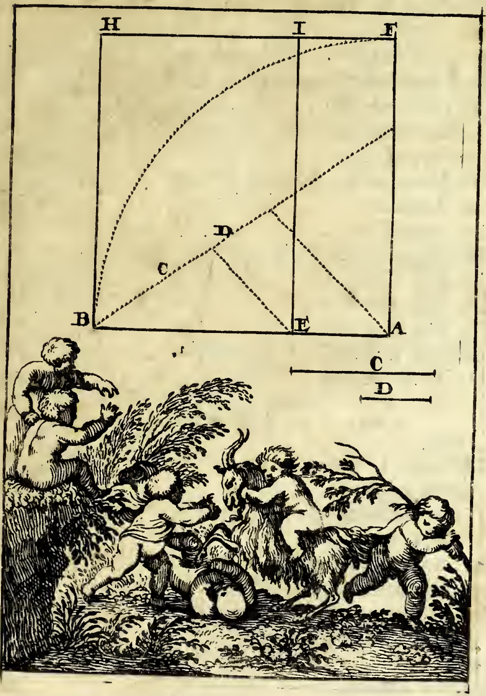
PROPOSITIO XII.

Super data recta duo rectangula conſtituere, ſecundùm datam rationem.

Sit data recta A B ſuper qua duo conſtituenda ſint Rectangula, quæ datam rationem C ad D inter ſe habeant.

PRAXIS.

p. 182 SEcetur recta — A B.
p. 80. in puncto — E.
juxta rationem — C ad A.
p. 54. Fac Quadratum — A B H F.
Duc rectam — E I.
parallelam rectæ — A F.
Erunt B E I H, A E I F quæſita Rectangula.
Eſt enim Rectangulum — A I.
ad rectangulum — E H.
ut recta — D.
ad rectam — C.
Et breviùs — A I. E H : : D. C.


H
I
F
D
C
B
E
A
C
D

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FINIS.

Du Rapport des echelles.

L'une des echelles employée par les géomètres du cadastre, son rapport est de 1 mètr. à 2500 c'est à dire que le millim. sur le papier valent 100 mètr. sur le terrain et un mètre vaut 100 m. exemple, si l'on prend un mètre sur l'echelle, il sera d'une 1/2500 et pour 100 mètres on aura 100/2500 = 1,04

Si 4 : 100 m. :: 100 cent. : 2500
on voit que la somme des extrêmes est egale à celle des moyens.

faisant la même opération pour l'echelle de 1 a 2500, on aura 0.08 fraction cent fois plus forte que la première.

Bap[illegible]

[illegible]

[illegible] 7 [illegible]

[illegible]

[illegible]

[illegible] B [illegible]

[illegible]

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